Department of Energy
Oak Ridge Operations
Weldon Spring Site
Remedial Action Project Office
Route 2, Highway 94 South
St. Charles, Missouri 63303

May 24, 1991

Addressees:

ENGINEERING EVALUATION COST ANALYSIS FOR THE PROPOSED MANAGEMENT OF CONTAMINATED STRUCTURES AT THE WELDON SPRING CHEMICAL PLANT

The United States Department of Energy at the Weldon Spring Site has issued for public review and comment the Contaminated Structures Engineering Evaluation/Cost Analysis (EE/CA) to document the proposal to dismantle 30 buildings/structures containing varying degrees of radioactive and chemical contamination. The action addresses five major process buildings and 25 other structures which were not used for direct processing of uranium. A similar program to dismantle 15 non-process buildings was previously announced and that work has already been initiated. On May 24, 1991 an advertisement was placed in the St. Charles Journal and St. Louis Post Dispatch announcing the availability of the plan. This plan has been concurred on by the EPA and the State of Missouri. There is no formal meeting scheduled.

Since the Chemical Plant operation ceased in the mid '60s, the buildings have deteriorated considerably. Broken windows, separated walls, damaged floors and leaky roofs present potential safety hazards to on-site personnel. As deterioration continues, contamination could be released off-site through wind dispersal and surface water run-off. The proposed dismantlement of these structures will reduce this possibility.

No significant environmental impacts are anticipated as a result of this action nor are any measurable increases in airborne contamination levels expected at the site perimeter. Contaminated materials will be safely stored. Their ultimate disposition will be addressed in plans for managing all site wastes and will be presented to the public later this year.

Anyone interested should feel free to contact the Site. We would be pleased to meet and discuss any issues or concerns individuals might have. The EE/CA is available for public inspection at the following locations:

- Spencer Creek Branch, St. Charles Public Library
- Kathryn Linneman Branch, St. Charles Public Library
- Kisker Road Branch, St. Charles Public Library
- Francis Howell High School Library
- Weldon Spring Site Remedial Action Project Public Reading Room (Administrative Record is also available at this location)

Comments postmarked by June 24, 1991, will receive a written response and become part of the Administrative Record for this action.

For more information contact the Community Relations Department at (314) 441-8086.

Sincerely,

SH McCracken

Stephen H. McCracken
Project Manager
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DOE/OR/21548-159

Engineering Evaluation/Cost Analysis for the Proposed Management of Contaminated Structures at the Weldon Spring Chemical Plant

May 1991

U.S. Department of Energy
Oak Ridge Operations Office
Weldon Spring Site Remedial Action Project

DOE/OR/21548-159

Engineering Evaluation/Cost Analysis for the Proposed Management of Contaminated Structures at the Weldon Spring Chemical Plant

May 1991

prepared by

J.M. Peterson and M.M. MacDonell

Environmental Assessment and Information Sciences Division, Argonne National Laboratory

prepared for

U.S. Department of Energy, Oak Ridge Operations Office, Weldon Spring Site Remedial Action Project, under Contract W-31-109-Eng-38

CONTENTS

CONTENTS (Cont'd)

FIGURES

TABLES

NOTATION

The following is a list of the acronyms, initialisms, and abbreviations (including units of measure) used in this document. Acronyms used in tables only are defined in the respective tables.

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

AEC	U.S. Atomic Energy Commission
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CFR	Code of Federal Regulations
CSR	Code of State Regulations
DAC	derived air concentration
DNT	dinitrotoluene
DOE	U.S. Department of Energy
EE/CA	engineering evaluation/cost analysis
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FS	feasibility study
HEPA	high-efficiency-particulate-air (filter)
HVAC	heating, ventilation, and air conditioning
ICRP	International Commission on Radiological Protection
MSA	material staging area
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act of 1969, as amended
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
PCB	polychlorinated biphenyl
PL	Public Law
PM-10	particulate matter with an aerodynamic mean diameter of <10 μm
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RI	remedial investigation
RSMo.	Revised Statutes of Missouri
SFMP	Surplus Facilities Management Program
Stat.	Statute(s)
TBC	to-be-considered (requirements)
TNT	trinitrotoluene
TSA	temporary storage area
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978
USC	U.S. Code
WITS	Waste Inventory Tracking System

NOTATION (Cont'd)

UNITS OF MEASURE

Ci	curie(s)
cm	centimeter(s)
cm^2	square centimeter(s)
cm^3	cubic centimeter(s)
dBA	decibel(s) A-weighted
dpm	disintegration(s) per minute
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram(s)
gal	gallon(s)
ha	hectare(s)
h	hour(s)
km	kilometer(s)
L	liter(s)
lb	pound(s)
μCi	microcurie(s)
μg	microgram(s)
μm	micrometer(s)
μR	microroentgen(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
MeV	million electron volt(s)
mg	milligram(s)
mi	mile(s)
mL	milliliter(s)
mR	milliroentgen(s)
mrad	millirad
mrem	millirem
pCi	picocurie(s)
ppm	part(s) per million
rad	radiation-absorbed dose
rem	roentgen-equivalent man
s	second(s)
t	metric ton(s)
WL	working level(s)
WLM	working-level month(s)
yd	yard(s)
yd^3	cubic yard(s)
yr	year(s)

FOREWORD

This engineering evaluation/cost analysis (EE/CA) report has been prepared to support the proposed removal action for managing contaminated structures at the chemical plant area of the Weldon Spring site, located in St. Charles, Missouri. The U.S. Department of Energy is responsible for cleanup activities at the site under its Surplus Facilities Management Program (SFMP). The major goals of SFMP are to eliminate potential hazards to human health and the environment that are associated with contamination at SFMP sites and to make surplus real property available for other uses, to the extent possible.

This EE/CA report was prepared to document the proposed removal action because the action is a non-time-critical response (i.e., it need not be implemented within 6 months). This documentation process is identified in guidance of the U.S. Environmental Protection Agency (EPA) that addresses removal actions at sites subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986. Actions at the Weldon Spring site are subject to CERCLA requirements because the site is listed on EPA's National Priorities List. This document was developed in consultation with EPA Region VII and the state of Missouri.

The objectives of this report are to (1) identify alternatives for managing the contaminated structures at the chemical plant area; (2) document the selection of a response that will mitigate the potential threat to workers, the general public, and the environment associated with these structures; and (3) address health and environmental impacts associated with the proposed action. Based on the analyses contained in this report, the proposed action is to (1) decontaminate the contaminated structures (i.e., remove loose radioactive contamination as well as asbestos and polychlorinated biphenyl contamination), (2) remove material currently within these structures and transport it to on-site temporary storage areas, and (3) dismantle the structures and transport the resultant waste to on-site temporary storage areas. This action is consistent with and would support comprehensive response actions being planned for the Weldon Spring site.

1 OVERVIEW OF RESPONSE ACTIONS AT THE WELDON SPRING SITE

The U.S. Department of Energy (DOE) is responsible for conducting response actions at the Weldon Spring site under its Surplus Facilities Management Program (SFMP). The site is located in St. Charles County, Missouri, about 48 km (30 mi) west of St. Louis (Figure 1). The Weldon Spring site became contaminated as a result of processing and disposal activities that took place from the 1940s through the 1960s, and it is listed on the National Priorities List (NPL) of the U.S. Environmental Protection Agency (EPA). The site consists of two noncontiguous areas: (1) the chemical plant area and (2) the quarry. The chemical plant area consists of 44 buildings and miscellaneous structures as well as four raffinate pits and two small ponds. The chemical plant area was previously used as an ordnance works facility to produce conventional explosives; later, a feed materials plant was constructed at the site to process uranium and thorium ore concentrates. The quarry is located about 6.4 km (4 mi) southwest of the chemical plant area and within 1.6 km (1 mi) of an alluvial well field that constitutes a major source of potable water for St. Charles County; the nearest supply well is located about 0.8 km (0.5 mi) southwest of the quarry. Various waste was disposed of in the quarry from 1942 to 1969; the waste therein consists of contaminated soil and sediment, rubble, metal debris, and equipment.

This engineering evaluation/cost analysis (EE/CA) report has been prepared in accordance with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, to document the proposed management of contaminated structures at the chemical plant area as an expedited response action. Because activities at the site are also conducted in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, the assessment of potential environmental impacts incorporated into this report will support a NEPA determination for the proposed action.

The role of this action as an expedited response action in the comprehensive remediation strategy for the Weldon Spring site is illustrated in Figure 2. Cleanup of the site consists of several components, as presented in the project work plan (Peterson et al. 1988). The overall remedial action for the site is being addressed in a remedial investigation/feasibility study (RI/FS) that is being supplemented to meet the requirements of an environmental impact statement (EIS) under NEPA. Under the integrated RI/FS-EIS process, alternatives are being evaluated for cleanup of the chemical plant area and disposing of waste generated by remediating the entire site. Various interim actions (both expedited response actions and interim remedial actions) will be performed prior to completion of the RI/FS-EIS in order to mitigate actual or potential releases of radioactive or chemical contaminants into the environment; management of the contaminated structures at the chemical plant area is such an action. The expedited response action being proposed in this EE/CA does not address final disposal decisions for waste resulting from this action; these decisions will be addressed in the RI/FS-EIS that is currently in preparation.

This EE/CA is being prepared to support a response to potential risks associated with contaminated structures at the chemical plant area of the Weldon Spring site. The structures have not been used for more than 20 years, and the deterioration that has occurred during this time has resulted in a potential threat to workers, the general public, and the environment. Many of the windows are broken, some walls have separated from the floors, floors have begun to break apart, and roofs have deteriorated to the extent that they leak badly during rainstorms. Wildlife at the chemical plant area is exposed to these contaminants as are workers who enter

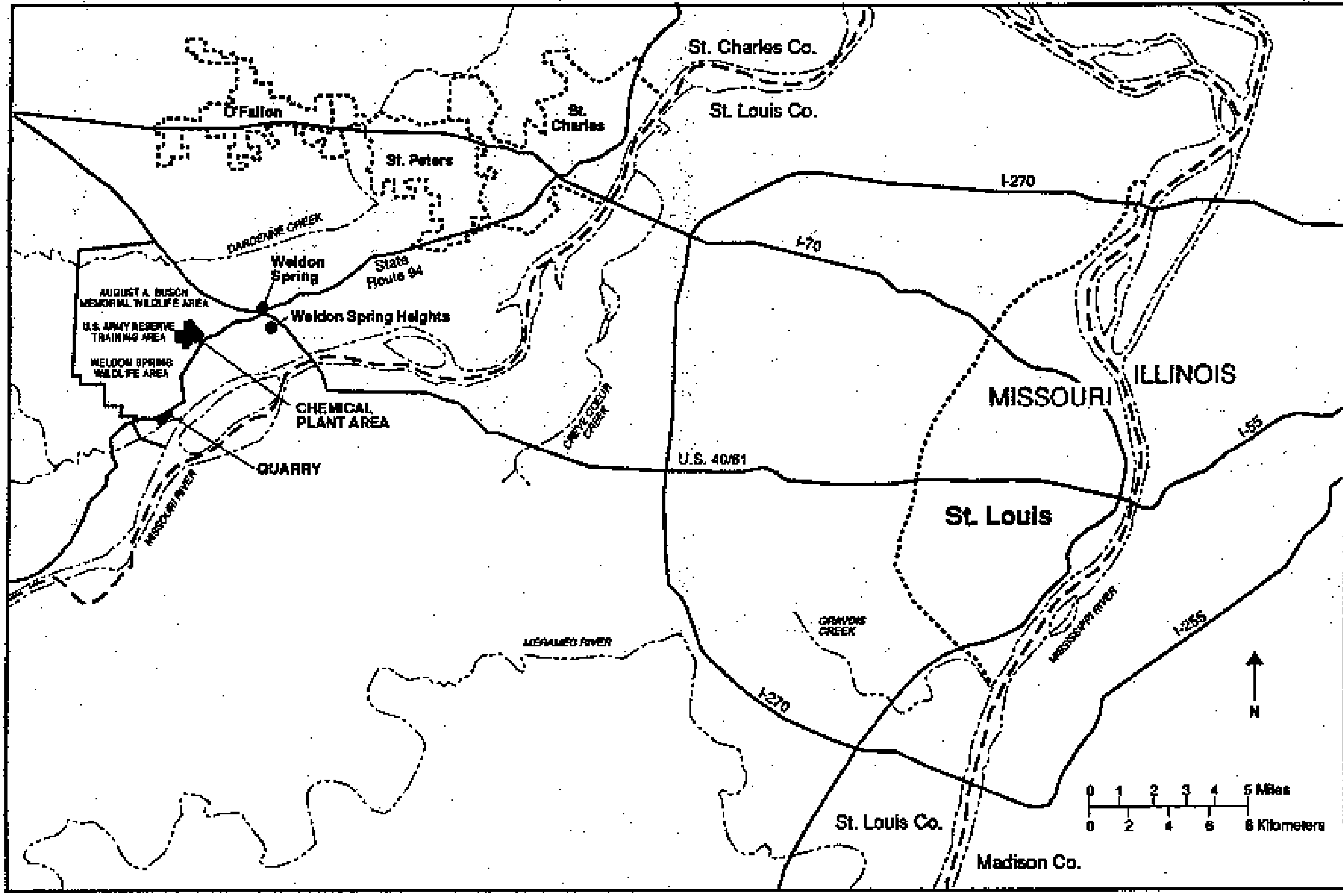
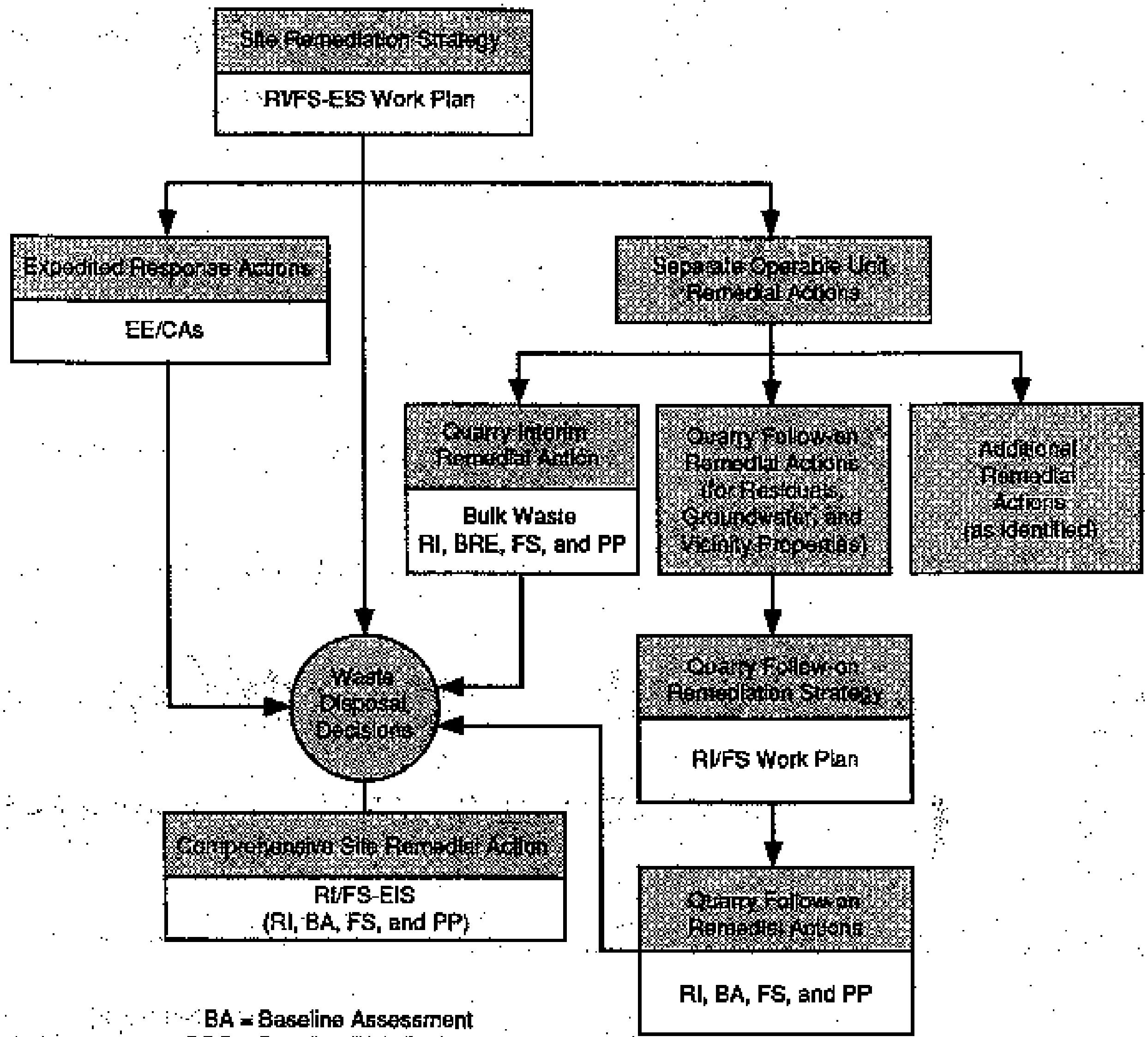


FIGURE 1 Location of the Weldon Spring Site



BA = Baseline Assessment
BRE = Baseline Risk Evaluation
EE/CA = Engineering Evaluation/Cost Analysis
EIS = Environmental Impact Statement
FS = Feasibility Study
PP = Proposed Plan
RI = Remedial Investigation

FIGURE 2 Major Environmental Compliance Activities and Related Documents for the Weldon Spring Site Remedial Action Project

the building for both maintenance and characterization activities. Although no impacts to the general public off-site are associated with the contamination present in these structures, potential exposure from contaminant releases could occur in the future via tracking, surface water runoff, or wind dispersal if a timely response is not implemented.

Based on the analyses presented in this EE/CA, the proposed action is to decontaminate and dismantle the contaminated structures and to temporarily store the resultant waste on-site. Most of the material would be stored at the Material Staging Area (MSA), where it would be sorted into potentially releasable and nonreleasable components. (Releasable components are those that can be managed or utilized without restrictions due to radioactive or chemical contamination.) Additional characterization of this material could be safely performed, as needed, to support future waste treatment and disposal actions. Alternatives for disposal of this material are currently being evaluated in the RI/FS-EIS. The only material resulting from the action addressed in this EE/CA that may be transported off-site is the material that meets criteria for release without radiological restrictions and has a resource recovery value.

The decontamination and dismantlement of 15 nonprocess buildings at the chemical plant area has been addressed as a separate removal action (MacDonell and Peterson 1989, 1990). Implementing the action proposed in this EE/CA would eliminate potential releases from the remaining surface structures at the chemical plant area and from some associated subsurface structures such as tanks and sewer lines.

2 SITE BACKGROUND

The chemical plant area of the Weldon Spring site (hereafter referred to as the site) is located about 3.2 km (2 mi) southwest of the junction of Missouri (State) Route 94 and U.S. Route 40/61 and the community of Weldon Spring (Figure 3). The site is accessible from State Route 94 and is fenced and closed to the public. It contains 44 buildings and support structures, as well as remnants of a railroad system, four raffinate pits, and two small ponds; the remainder of the site is covered with gravel, debris, paved surfaces, and vegetation (predominantly grasses, shrubs, and small trees). The August A. Busch Memorial Wildlife Area is located to the north, the Weldon Spring Wildlife Area to the south and east, and the U.S. Army Reserve and National Guard Training Area to the west of the site.

A general discussion of site history is provided in Section 2.1, and information on the contaminated structures is presented in Section 2.2. Site conditions that justify the removal action proposed in this EE/CA are discussed in Section 2.3.

2.1 SITE HISTORY

In April 1941, the U.S. Department of the Army acquired about 7,000 ha (17,000 acres) of land in St. Charles County, Missouri, to construct the Weldon Spring Ordnance Works. From November 1941 through January 1944, the Atlas Powder Company operated the ordnance works for the Army to produce trinitrotoluene (TNT) and dinitrotoluene (DNT) explosives. The ordnance works began operating again in 1945 but was closed and declared surplus to Army needs in April 1946. By 1949, all but about 810 ha (2,000 acres) had been transferred to the state of Missouri (August A. Busch Memorial Wildlife Area) and the University of Missouri (agricultural land). Much of the land transferred to the University of Missouri was subsequently developed into the Weldon Spring Wildlife Area. Except for several small parcels transferred to St. Charles County, the remaining property became the chemical plant area of the Weldon Spring site and the adjacent U.S. Army Reserve and National Guard Training Area.

The U.S. Atomic Energy Commission (AEC, a predecessor of DOE) acquired 83 ha (205 acres) of the former ordnance works property from the Army by permit in May 1955, and the property transfer was approved by Congress in August 1956. An additional 6 ha (15 acres) was later transferred to the AEC for expansion of waste storage capacity. The AEC constructed a feed materials plant – now referred to as the chemical plant – on this property for processing uranium and thorium ore concentrates. The feed materials plant was operated for the AEC by the Uranium Division of Mallinckrodt Chemical Works from 1957 to 1966. Between 1958 and 1964, four raffinate pits were constructed in the southwest portion of the site to contain process wastes from the plant. During operations, uranium ore concentrates were processed to produce uranium metal; intermediate forms in the chemical processing operation included uranium dioxide, uranium trioxide, and uranium tetrafluoride. An average of 14,000 t (16,000 tons) of uranium-containing material was processed per year. A small amount of thorium ore concentrate was also processed at the plant. These processes generated several chemical and radioactive waste streams, which were piped to the raffinate pits. The solids settled to the bottom of the pits, and the supernatant liquids were decanted to the plant process sewer that drained off-site down the Southeast Drainage (a natural channel) to the Missouri River.

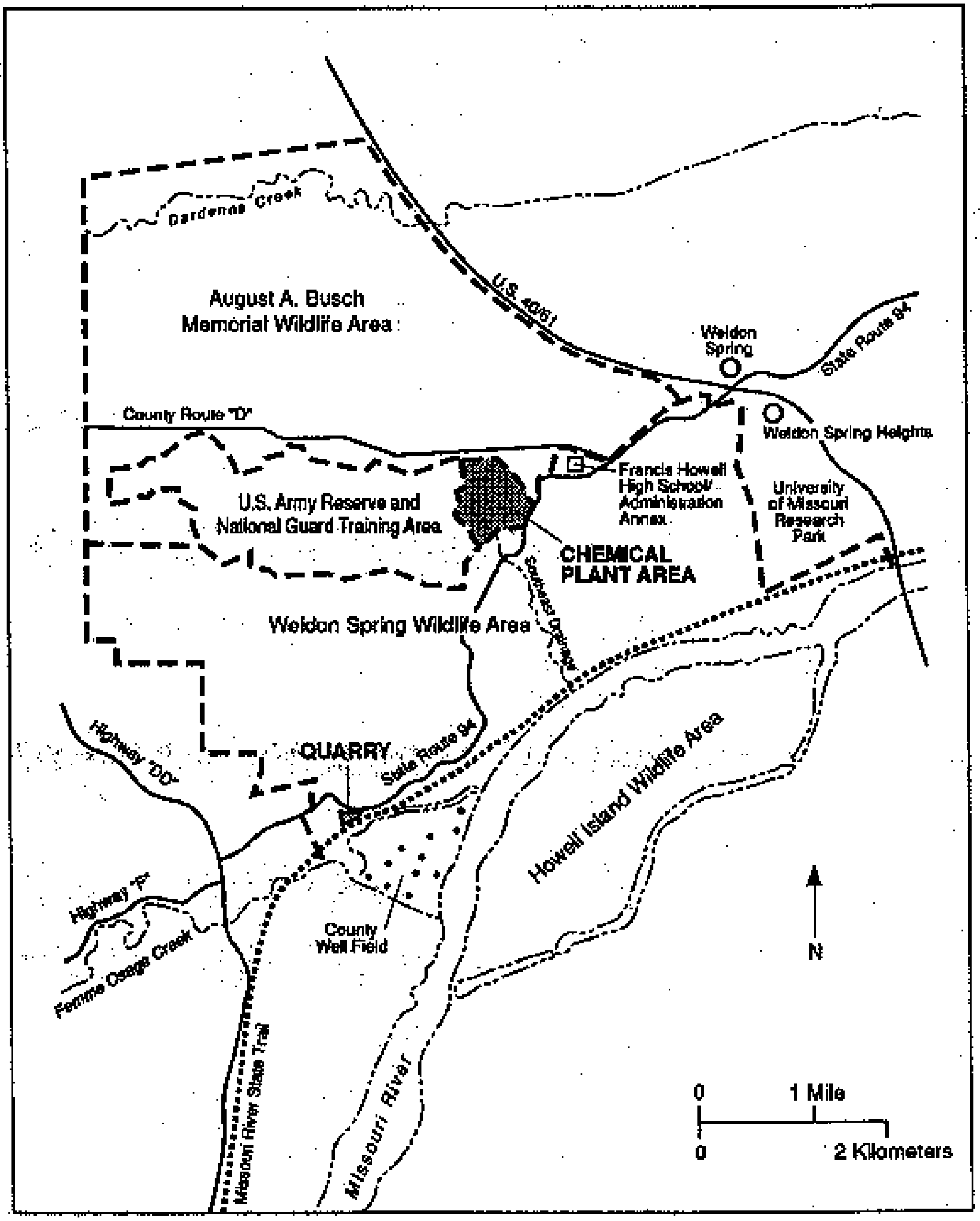


FIGURE 3 Map of the Weldon Spring Site and Vicinity

In 1967, the Army reacquired the chemical plant following closure by the AEC and began converting the facility for herbicide production. Some plant buildings were partially decontaminated, and some equipment was dismantled. Contaminated rubble and equipment from the partially decontaminated buildings were placed in the quarry and in raffinate pit 4. In 1969, prior to becoming operational, the herbicide project was canceled. Since that time, the plant has remained essentially unused and in caretaker status.

In 1971, the Army returned the 21-ha (51-acre) portion of the property containing the raffinate pits to the AEC but retained control of the rest of the site. As successor to the AEC, DOE assumed responsibility for the raffinate pits. During 1984, the Army repaired several of the buildings; decontaminated some of the floors, walls, and ceilings; and removed some contaminated equipment to areas outside of the buildings. In May 1985, DOE designated the control and decontamination of the Weldon Spring site as a major federal project under SFMP. In May 1988, DOE redesignated the project as a major system acquisition.

On October 1, 1985, custody of the Army portion of the site was transferred to DOE. On October 15, 1985, the EPA proposed to include the Weldon Spring quarry on its NPL; this listing occurred on July 22, 1987 (EPA 1987). On June 24, 1988, the EPA proposed to expand the listing to include the chemical plant area. This proposal was finalized on March 13, 1989 (EPA 1989a), and the expanded site was placed on the NPL under the name "Weldon Spring Quarry/Plant/Pits (USDOE/Army)." The balance of the former Weldon Spring Ordnance Works property -- which is adjacent to the DOE portion and for which the Army has responsibility -- was proposed for separate NPL listing on July 14, 1989 (EPA 1989b). This listing was finalized as "Weldon Spring Former Army Ordnance Works" on February 21, 1990 (EPA 1990a).

2.2 DESCRIPTION OF THE CONTAMINATED STRUCTURES

Thirty contaminated structures are addressed in this proposed action, including remnants of the on-site railroad system and subsurface tanks. General descriptions of these structures and brief descriptions of the materials currently located in these structures are presented in Table 1. These structures range from small facilities with low levels of contamination to large process buildings that are heavily contaminated. The locations of these 30 structures and of the 15 nonprocess buildings that were the subject of a separate removal action are shown in Figure 4. The contents of the structures associated with this action are listed in detail in Appendix A.

These structures have been characterized to evaluate the degree to which they are radioactively and chemically contaminated. Extensive radiological characterization studies have been performed; more than 26,000 separate measurements have been made for these 30 structures and the material contained therein. One of the objectives of the radiological characterization effort was to determine the amount of material that could be released for reuse without radiological restrictions. A major finding of this effort was that contamination was generally widespread such that no structure or piece of equipment could be released for unrestricted use until further radiation measurements were performed. An additional objective of the characterization effort was to assess potential health impacts associated with exposure to the structures and their contents. A summary of the radiological characterization results pertinent to an assessment of the potential risks posed by these structures is given in Tables 2, 3, and 4. Much of this information was extracted from a report of MK-Ferguson Company and Jacobs Engineering Group (1990a), which summarizes the results of five separate investigations conducted between 1967 and 1989. Additional information was obtained from Miller (1991).

The 30 structures associated with this action have also been surveyed for asbestos-containing material, polychlorinated biphenyls (PCBs), and other chemical contaminants. The chemical characterization results for these structures are summarized in Tables 5 and 6. In addition to asbestos and PCB contamination, various chemicals are present in pipes and process

TABLE 1 Description of the 30 Contaminated Structures[a]

Structure	Description	Past Use	Contents
101	A 100-ft × 120-ft structural-steel-frame building with corrugated asbestos-cement siding and poured concrete roof and floor; has a 30-ft × 30-ft annex. The overall height of the building is 100 ft, with six operating levels. A 250-ft × 300-ft concrete storage pad is located on the northern side of building.	Designed to process approximately 75 tons of low-assay uranium ore concentrates per day. Housed equipment and facilities for drying, grinding, screening, blending, and sampling ore concentrates and process residues. Incoming ore concentrates and residues were stored in drums on the concrete storage pad.	Contains a four-story rotary kiln-type calciner in the southeast corner of the building and a small amount of insulated piping and conduit. All other process equipment has been removed.
102A,B	Open areas covering 9,900 ft^2 and 2,200 ft^2, respectively. Equipment was located on concrete dikes with earthen bottoms. The pedestals and dikes remain.	Provided facilities for unloading, storing, and transferring liquid process materials that were required in the refinery operation and were supplied or handled in tank-car and tank-truck quantities.	Contains scaffolding, catwalks, electric control boxes, a rusted 4,500-gal tank on a concrete pad, and a 25,000-gal steel silo tank on a concrete base.
103	A 225-ft × 121-ft structural-steel-frame building with corrugated aluminum siding and roof and a concrete slab floor. The building is three stories high and consists of three major sections: northern digestion section, middle denitration section, and an office section separated from the remainder of the building by a concrete-block wall. The exterior walls of the office section are constructed of concrete blocks.	The northern digestion section received uranium ore concentrates which, after digestion, were transferred as a slurry to Building 105 where the solvent was purified by extraction. The middle denitration section received the purified uranium nitrate solution, which was denitrated to yield uranium trioxide. During later years, thorium products were also processed in this building.	All equipment, electrical circuits, and piping have been removed from the middle denitration and office sections. Office furniture and equipment remain, along with conduit and insulated piping. All of the piping and most of the original equipment and floor plates were removed from the northern digestion section by the Army. The Army subsequently installed some process equipment in anticipation of herbicide production. The floor in the southwest corner of the northern digestion section was covered with a layer of tar by the Army after unsuccessful decontamination attempts. The curbings around the floor remain.

TABLE 1 (Cont'd)

Structure	Description	Past Use	Contents
105	A 185-ft × 102-ft, three-story structural-steel-frame building on a poured concrete slab with corrugated aluminum siding and roof. Consists of three sections (east, northwest, and southwest) separated by two solid, explosion-proof cinder-block walls about 90 ft high.	Previously used for producing a highly purified uranyl nitrate hexahydrate solution by means of extraction columns, process vessels, evaporators, and tributyl phosphate and hexane reaction tanks.	All original equipment and floor plating have been removed. A coating of tar and sections of plywood cover the floor in parts of the southwest and east sections where Army decontamination efforts were unsuccessful. Insulated piping and conduit remain.
106	A belowground concrete structure covered by an aboveground prefabricated steel building. The steel building is 12 ft × 12 ft × 14 ft high; the belowground structure is 12 ft × 12 ft × 10 ft deep.	Used as a sampling station for process waste streams.	Contains equipment formerly used to sample the process waste streams in both the aboveground and below-ground structures. Conduit and insulated piping also remain.
108	A 65-ft × 45-ft, one-story structural-steel building with corrugated aluminum siding and roof. Associated 20-ft and 60-ft towers remain. The gross area covered by the facility is about 2,900 ft^2, of which 1,300 ft^2 is under the roof.	Used for recovering and reconcentrating nitric acid and oxides of nitrogen.	Contains original process equipment and insulated piping.
109,110	Two open-sided steel-beam storage sheds with sheet-metal roofs located on one large poured concrete pad. Each shed is 40 ft × 80 ft. A concrete pad is located adjacent to the sheds.	Used to store drums containing ore concentrates and process residues.	Contains overhead piping, tanks, motors, railroad ties, and debris from dismantlement of Buildings 401 and 409.

TABLE 1 (Cont'd)

Structure	Description	Past Use	Contents
201	A 193-ft × 175-ft, five-story structural-steel and cinder-block building with corrugated asbestos-cement and cinder-block walls, a flat poured gypsum roof, and a poured concrete floor. The building is divided into a warehouse area, repair area, office area, and production area having a high ceiling. The overall height of the building is 75 ft.	Used for converting uranium trioxide to uranium dioxide and uranium tetrafluoride.	Contains reduction and hydrofluorination reactors; blending and packaging equipment; ammonia cracking and inert gas-generating equipment; pilot, rerun, and reverter reactors; and vaporization, dust-collection, and waste-recovery systems. Also contains insulated piping, furniture, and plumbing fixtures.
202	A 3,080-ft^2 structural-steel-frame building with asbestos-cement wall panels and a poured gypsum roof. Consists of three sections: anhydrous hydrofluoric acid section, 70% hydrofluoric acid section, and anhydrous ammonia section.	Used for tank car unloading and storage of hydrofluoric acid and ammonia.	Contains eight large carbon-steel tanks, beam scales, pumps, insulated piping, and conduit.
301	A one-story steel-frame building of mill construction with corrugated asbestos-cement siding; has a flat roof deck of gypsum concrete with built-up roofing and a gross floor area of 68,000 ft^2. Office areas are enclosed by concrete-block construction.	Used for converting uranium tetrafluoride to uranium metal.	Much of the original equipment remains in place, along with equipment gathered from other buildings that was stored there during previous decontamination efforts. Materials in storage include insulated piping, furniture, and plumbing fixtures.
303	A 1-ft-thick reinforced concrete pad measuring 120 ft x 70 ft, with footings.	Served as a material storage pad.	Contains debris from Building 434 renovation, Building 409 demolition, and cleanup of the chemical plant area. Debris consists of steel fence posts, telephone poles, asbestos-containing roofing material, and rubble from a concrete slab.

TABLE 1 (Cont'd)

Structure	Description	Past Use	Contents
403	A rigid-frame, welded-design mill-type structure with a gross floor area of about 17,800 ft^2. A fire wall separates this building into distinct north and south sections.	Designed to house pilot-plant equipment for testing modifications to processing carried out in the digestion, extraction, and denitration areas. Later uses also included processing of scrap metals and production of thorium.	Most of the original equipment has been removed. Currently contains a large stainless steel tank (salt bath) in the north section; this tank contains an unknown quantity of thorium nitrate. The building also has a stack and associated blower. Insulated piping and a small amount of office equipment also remain.
404	A rigid-frame, welded-design mill-type structure with corrugated aluminum roof and siding and about 12,400 ft^2 of gross floor area.	Provided facilities for metal processing studies, ceramic work, and metal testing; also housed the metallurgical pilot plant.	Contains blenders, jolters, breakout equipment, a small ceramics laboratory, and a large-scale dingot furnace. Insulated piping also remains.
405A,B	Structure 405A is a simple rigid-frame building with corrugated aluminum roof and siding. Structure 405B is a concrete pad having a gross area of about 4,000 ft^2.	Structure 405A was a small shop and storage building used to store spare pilot-plant equipment. The dust collectors and vacuum cleaning system for Buildings 403 and 404 were located on Structure 405B.	Contains much of the original equipment as well as insulated piping.
406	A 194-ft × 78-ft, one-story cinder-block building divided into four interconnecting areas. It has concrete footings, piers, and curtain wall supporting structural-steel, rigid-frame bents enclosed within concrete-block walls, and it is covered with a poured roof deck.	Served as a warehouse and office area.	Currently designated as a chemical consolidation area and contains small quantities of both hazardous and nonhazardous materials. Insulated piping and plumbing fixtures remain.

TABLE 1 (Cont'd)

Structure	Description	Past Use	Contents
407	A one-story structural-steel-frame building with concrete-block exterior walls and a flat roof constructed of lightweight concrete. Encloses a gross area of approximately 53,900 ft^2 divided into 113 rooms of various sizes. A small metal storage building and a small concrete-block building are adjacent to Building 407.	Used as an analytical chemistry laboratory.	A penthouse on the roof contains an electrical substation and heating and cooling equipment. Numerous pieces of small equipment are located throughout the building and insulated piping also remains.
408	A 361-ft × 193-ft, one-story structural-steel-frame building enclosed by concrete-block walls, with a gross floor area of about 70,000 ft^2. The building has a flat built-up roof on a deck of gypsum concrete. A north-south masonry wall divides the building in half.	Contained numerous maintenance shops, office area, garage, receiving and shipping area, decontamination room, and a large storage area.	Contains many pieces of equipment and furniture, including loose nuts and bolts, chairs, workbenches, and large drill presses. A payloader, a crane, an all-terrain vehicle, insulated piping, and plumbing fixtures are also present.
410	A one-story structural-steel-frame concrete-block building with a flat poured roof and a poured concrete floor having a gross floor area of about 52,100 ft^2.	Contained the plant security office, health and safety office, kitchen, dining room, laundry facility for contaminated clothing, and clean and contaminated locker rooms with shower facilities.	Contains many large and small pieces of equipment ranging from electric boilers to dishes. Insulated piping and plumbing fixtures also remain.
414	A 26-ft × 60-ft, one-story prefabricated-steel building with corrugated aluminum siding situated on a 150-ft × 200-ft reinforced-concrete storage pad that is 7 in. thick.	Served as a salvage shop and equipment storage space.	Contains storage cabinets, incandescent lamps, and insulated piping. This building is currently being used to store maintenance equipment.
426	An elevated, ellipsoid-shaped water-storage tank situated on six legs, with a capacity of 350,000 gal. The total height of the tank is about 187 ft.	Used for water storage.	The tank currently contains water and is an operating component of the St. Charles County public water supply system.

TABLE 1 (Cont'd)

Structure	Description	Past Use	Contents
427	A reinforced-concrete structure, 55 ft x 21 ft x 26 ft deep.	Served as the primary sewage treatment plant for the site.	Contains equipment associated with sewage treatment. Large pieces include an Imhoff tank, comminutor and bar screen structure, and a sump.
429	A pump house and a 700,000-gal ground storage tank, which were collectively known as the Water Reserve Facilities. The pump house is a 28-ft × 24-ft × 17-ft high prefabricated-steel building erected on a reinforced concrete slab.	Used for water storage.	Contains piping, electrical boxes, water pumps, large steel water-storage tanks, and insulated piping.
430	A 20-ft × 20-ft × 15-ft high cinder-block structure with an aluminum corrugated ceiling and garage door.	Used as an ambulance garage.	Contains cabinets and miscellaneous debris, including insulated piping, light fixtures, and portable ladders.
431	A belowground concrete structure and flume covered by an aboveground prefabricated-steel building. The steel building is 12 ft × 12 ft × 14 ft high; the belowground structure is 12 ft × 12 ft × 13 ft deep.	Used as a sampling station for process waste streams.	Contains proof samples enclosed in a cabinet, a storage tank, instrumentation, and an electrical heater.
432	A belowground concrete structure and flume-covered by an aboveground prefabricated-steel building. The steel building is 12 ft × 12 ft × 14 ft high; the belowground structure is 12 ft × 12 ft × 13 ft deep.	Used as a sampling station for process waste streams.	Contains items similar to those in Buildings 106 and 431, including insulated piping and conduit.

TABLE 1 (Cont'd)

Structure	Description	Past Use	Contents
434	A one-story steel-beam-frame building with sheet metal exterior and a gross floor area of about 19,200 ft^2. The floor is a paved concrete slab.	Used for storage of high-value ore concentrates.	Currently designated as a storage area for wastes determined to be hazardous under the Resource Conservation and Recovery Act of 1976, as amended; contains numerous drums of both hazardous and nonhazardous materials.
On-site railroad system	A double-track railroad with three crossovers. The system is complete with ties and limestone ballast and includes 15,880 linear feet of rail, 14 turnouts, 2 road crossings, and 5,265 tons of ballast.	Served as rail access to the site during past construction and operations. Installed to deliver raw materials to and remove product from the plant.	Includes a diesel switching engine.

[a]See Appendix C for English/metric and metric/English conversion factors.

Sources: Description and past use are based on information provided in AEC (1960); contents are based on historical use and personal observation.

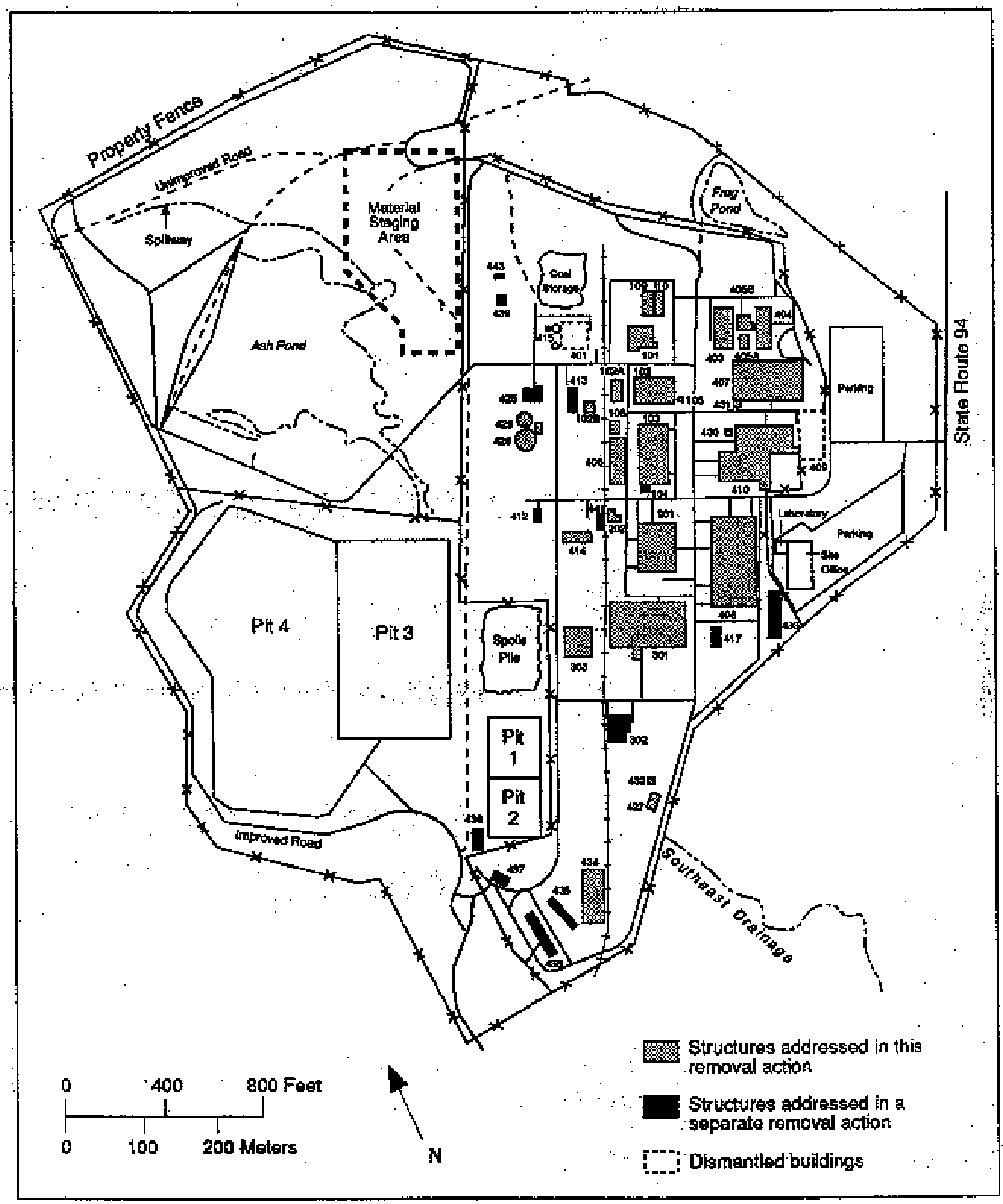


FIGURE 4 Site Layout Showing the Locations of Contaminated Structures

TABLE 2 Summary of Radiological Characterization Results for Bulk Samples[a]

Structure	Number of Measurements	Average Radionuclide Concentrations in Bulk Samples[b] (pCi/g) Uranium -238	Thorium -232	Thorium -230	Radium -228	Radium -226
101	3	590	-	-	4.4	1.7
102A,B	0	-	-	-	-	-
103	3	360	-	-	16	2.1
105	3	88	-	-	5.1	1.1
106	1	600	-	-	2,700	17
108	3	380	-	-	1,900	6.0
109,110	0	-	-	-	-	-
201	3	9,400	-	-	18	7.8
202	3	140	-	-	3.4	0.4
301	3	2,400	-	-	25	1.1
303	0	-	-	-	-	-
403	4	12,000	-	-	2,800	81
404	3	4,400	-	-	8.5	3.1
405A,B	2	8,700	-	-	43	7.0
406	5	81	2.4	250	2.2[c]	1.2
407	26	210	2.9	5.9	5.1[c]	0.9
408	10	280	1.0	7.8	0.7[c]	4.5
410	10	82	1.5	12	1.6[c]	1.8
414	5	15	1.3	5.2	0.2	1.1
426	0	-	-	-	-	-
427	0	-	-	-	-	-
429	3	8.7	-	-	0.4	0.5
430	5	95	3.4	6.7	11[c]	2.2
431	5	660	3.8	12	6.2[c]	3.6
432	5	88	1.3	10	1.2[c]	3.1
434[d]	4	870	1.9	110	2.0[c]	13
Railroad system	0	-	-	-	-	-

[a]These results are indicative only of the degree to which the structures are contaminated and do not necessarily represent true average concentrations present therein. The levels of contamination on structures for which no bulk samples were taken are expected to be low; the contamination on the outdoor storage pads (102A, 102B, 109, 110, and 303) is primarily fixed contamination.

[b]All values are rounded to two significant figures; a hyphen means that no data are available.

[c]Reported values are for thorium-228, which is assumed to be in secular equilibrium with radium-228.

[d]Concentrations are based on measurements made prior to decontamination for use as a temporary storage facility. Loose contamination was removed to the maximum extent practical; however, fixed contamination is still present.

Sources: MK-Ferguson Company and Jacobs Engineering Group (1990a); Miller (1991).

TABLE 3 Summary of Characterization Results for Airborne Alpha-Emitting Particulates

Structure	Number of Measurements[a]	Concentrations of Long-Lived Alpha Particulates in Air[b] (µCi/mL)	
		Range	Average
101	0	-	-
102A,B	0	-	-
103	0	-	-
105	0	-	-
106	0	-	-
108	0	-	-
109,110	0	-	-
201	NQ	1×10^{-13} - 2×10^{-11}	-
202	1	2.5×10^{-12}	2.5×10^{-12}
301	NQ	8×10^{-14} - 9×10^{-12}	-
303	0	-	-
403	NQ	1×10^{-13} - 6×10^{-11}	-
404	NQ	7×10^{-13} - 6×10^{-12}	-
405A,B	NQ	2×10^{-13} - 2×10^{-11}	-
406	2	3.2×10^{-13} - 4.4×10^{-13}	3.8×10^{-13}
407	3	2.0×10^{-13} - 6.7×10^{-13}	5.0×10^{-13}
408	1	3.1×10^{-13}	3.1×10^{-13}
410	2	1.5×10^{-13} - 3.7×10^{-13}	2.6×10^{-13}
414	2	3.1×10^{-13} - 8.5×10^{-13}	5.8×10^{-13}
426	0	-	-
427	0	-	-
429	0	-	-
430	0	-	-
431	0	-	-
432	0	-	-
434	1	1.9×10^{-14}	1.9×10^{-14}
Railroad system	0	-	-

[a]NQ = not quantified; information for these structures is based on surveys conducted in 1986 by Bechtel National, Inc., for which the number of measurements was not documented.

[b]All values are rounded to two significant figures. A hyphen means that no data are available. For purposes of comparison, the derived air concentration for limiting radiation exposure to workers from inhalation of uranium isotopes is 2×10^{-11} µCi/mL.

Source: MK-Ferguson Company and Jacobs Engineering Group (1990a).

TABLE 4 Summary of Radon Characterization Results

Structure	Number of Measurements	Radon Decay Product Concentrations[a] (WL)			
		Radon-220		Radon-222	
		Range	Average	Range	Average
101	2	0.0007 - 0.001	0.00085	0.002 - 0.002[b]	0.002
102A,B	0	-	-	-	-
103	4	0.0005 - 0.09	0.043	0.0007 - 0.08	0.021
105	5	0.05 - 0.07	0.064	0.0003 - 0.002	0.0015
106	1	0.55	0.55	<0.002	<0.002
108	3	0.08 - 1.5	0.64	-	-
109,110	0	-	-	-	-
201	4	0.0009 - 0.005	0.0025	0.001 - 0.003	0.002
202	0	-	-	-	-
301	4	0.005 - 0.32	0.10	<LLD[c] - 0.001	0.001
303	0	-	-	-	-
403	12	0.06 - 2.5	0.61	0.001[d]	0.001
404	5	0.01 - 0.03	0.014	<LLD - 0.002	0.001
405A,B	0	-	-	-	-
406	2	0.01 - 0.01[b]	0.01	0.001 - 0.005	0.003
407	6	0.001 - 0.14	0.067	<LLD - 0.006	0.0024
408	2	0.001 - 0.003	0.002	0.002 - 0.004	0.003
410	2	0.002 - 0.003	0.0025	0.001 - 0.001[b]	0.001
414	0	-	-	-	-
426	0	-	-	-	-
427	0	-	-	-	-
429	0	-	-	-	-
430	0	-	-	-	-
431	1	0.007	0.007	0.001	0.001
432	1	0.007	0.007	0.003	0.003
434	0	-	-	-	-
Railroad system	0	-	-	-	-

[a]Values are rounded to two significant figures. A hyphen means that no data are available. WL = working level; one working level is any combination of short-lived radon decay products in 1 liter of air, without regard to the degree of equilibrium, that will result in the emission of 1.3×10^5 MeV of alpha energy. For purposes of comparison, the derived air concentrations for limiting radiation exposure to workers from inhalation of radon-220 and radon-222 decay products are 1 WL and 1/3 WL, respectively.

[b]Both measurements were the same.

[c]LLD = lower limit of detection.

[d]Only one measurement of radon-222 decay products was taken in Building 403.

Source: MK-Ferguson Company and Jacobs Engineering Group (1990a).

TABLE 5 Summary of PCB Characterization Results[a]

	Swipe Samples ($\mu g/100\ cm^2$)			Bulk Samples (ppm)		
Structure	No. of Samples	Range	Average[b]	No. of Samples	Range	Average[b]
101	1	2.3	2.3	0	-	-
102A,B	0	-	-	1	9.6	9.6
103	2	0.9 - 1.1	1.0	0	-	-
105	1	1.4	1.4	2	16 - 240	130
106	0	-	-	0	-	-
108	1	0.2	0.2	1	81	81
109,110	1	<1	<1	1	39	39
201	6	<1 - 15	4.4	2	<12 - 12	12
202	7	<1 - 93	27	2	<1 - <1[c]	<1
301	10	<1 - 19	6.3	4	2 - 20	13
303	0	-	-	0	-	-
403	4	3.2 - 14	7.4	0	-	-
404	4	<1 - 4	2.2	2	18 - 990	500
405A,B	1	5.9	5.9	0	-	-
406	16	<1 - 126	17	2	<1 - 1	1
407	36	<1 - 640	31	7	0.082 -13,000	1,800
408	34	<1-29,000	870	20	<1 - 1,100	120
410	28	<1 - 36	7.9	2	<11 - <11[d]	<11
414	8	<1 - 35	8.4	3	<5 - 740	250
426	0	-	-	0	-	-
427	0	-	-	0	-	-
429	1	0.9	0.9	0	-	-
430	1	<1	<1	0	-	-
431	1	25	25	0	-	-
432	1	<1	<1	1	1,300	1,300
434	8	<1 - 4	2.4	1	<1	-
Railroad system	0	-	-	0	-	-

[a]All measurements have been rounded to two significant figures. A hyphen means that no data are available.

[b]For purposes of calculating average concentrations, the detection limits were treated as actual PCB concentrations for those samples reported to be below detectable quantities.

[c]Both measurements were reported as <1 ppm.

[d]Both measurements were reported as <11.3 ppm.

Sources: MK-Ferguson Company and Jacobs Engineering Group (1988, 1990b); Sundram (1991).

TABLE 6 Estimated Volume of Asbestos-Containing Material in the 30 Structures

	Estimated Volume of Asbestos Contamination[a] (ft^3)		
Structure	Pipe Insulation	Structural[b]	Equipment Wrapping
101	200	5,400	-
102A,B	-	-	-
103	67	29	-
105	170	-	-
106	2	-	-
108	2,700	800	-
109,110	-	-	-
201	3,700	13,000	12,000
202	1,300	1,300	-
301	1,700	23,000	13,000
303	-	-	-
403	610	6,100	-
404	610	4,100	4,100
405A,B	2,000	1,800	1,800
406	400	5,300	-
407	1,000	17,000	8,300
408	370	25,000	6,700
410	620	19,000	12,000
414	130	1,700	-
426	-	-	-
427	-	-	-
429	33	-	-
430	-	-	-
431	2	-	-
432	2	-	-
434	-	-	-
Railroad system	-	-	-

[a]All measurements have been rounded to two significant figures. A hyphen means that no data are available. Factors used to convert from English to metric units are provided in Appendix C.

[b]Structural estimate includes asbestos from ceiling, floor tile, siding, and roofing.

Sources: MK-Ferguson Company and Jacobs Engineering Group (1988, 1990b); Sundram (1991).

vessels; these structures are being characterized as part of an ongoing response action, i.e., the consolidation and containerization of process chemicals. Contaminated liquid and sludge in process vessels and pipes will be removed as a part of this program.

Additional chemical characterization of the structures is currently being performed and includes consideration of historical records for the various structures. This characterization effort focuses on identifying potentially hazardous material that must be properly managed to protect the safety of workers and the environment. Many of the buildings contain equipment, tanks, and piping used to process uranium and thorium materials, and remnants of the chemicals used in these processing operations probably remain in some of the facilities. For example, the activities conducted in Buildings 201, 202, and 301 used various chemicals such as anhydrous ammonia, hydrofluoric acid, potassium hydroxide, and magnesium fluoride. Additional examples of potentially contaminated buildings include Building 407, which may contain perchlorates in hoods (an explosive hazard), azides in lead pipes, and some mercury contamination on floors and in drains and pipes. Also, Building 403 may have been previously used as a chemical laboratory, which suggests that a variety of chemical contaminants may be present. The current characterization program will provide the data needed to adequately protect workers during implementation of the preferred alternative (see Chapter 5 for a description of this alternative).

2.3 SITE CONDITIONS THAT JUSTIFY A REMOVAL ACTION

Since closure of the chemical plant more than 20 years ago, the various structures have deteriorated considerably. Many of the windows are broken, some walls have separated from the floors, floors have begun to break apart, and roofs have deteriorated to the extent that they leak badly during rainstorms. The PCB contamination of floors and the radioactive contamination of various surfaces (e.g., associated with interior dust, equipment, building surfaces, and roofing material) currently represent potential exposure hazards to on-site personnel. As building deterioration continues, this contamination could threaten the general public and the environment off-site, e.g., via tracking, surface water runoff, or wind dispersal. In addition, the panels, tiles, and protective coverings of asbestos-containing material in the buildings could continue to deteriorate, thereby increasing the potential for asbestos release and exposure.

The potential for health and safety threats on-site and for contaminant releases off-site will increase over time if these structures continue to deteriorate. Expedited dismantlement of these structures, i.e., prior to completion of the RI/FS-EIS, would reduce associated occupational hazards on-site as well as potential threats to human health and the environment from off-site releases of chemical and radioactive contaminants. The proposed action is consistent with current plans for site remediation and would facilitate the cleanup process by allowing for additional characterization activities to be performed in a timely manner.

3 REMOVAL ACTION OBJECTIVES

The general objectives of the proposed removal action are to (1) eliminate, reduce, or otherwise mitigate the potential for release of radioactive and chemical contaminants from the chemical plant structures; (2) minimize potential threats to human health and the environment resulting from exposure to these contaminants; (3) reduce or eliminate the safety hazards associated with the deteriorating structures; and (4) support comprehensive site remediation. The specific objectives are addressed in Sections 3.1 through 3.4 in terms of statutory limits, scope and purpose of the proposed action, schedule, and compliance with regulatory requirements.

3.1 STATUTORY LIMITS

Authority for responding to releases or threats of releases from a contaminated site is addressed in Section 104 of CERCLA. Executive Order 12580 delegates to DOE the response authority for DOE sites. Under CERCLA Section 104(b), DOE is authorized to undertake such investigations, surveys, testing, or other data gathering deemed necessary to identify the existence, extent, and nature of the contaminants present at the Weldon Spring site, including the extent of threats to human health and the environment. In addition, DOE is authorized to undertake planning, engineering, and other studies or investigations appropriate for directing response actions to prevent, limit, or mitigate potential risks associated with the site. The statutory limits of Superfund-financed removal actions are 1 year and $2 million, as specified in Section 104(c)(1) of the Superfund Amendments and Reauthorization Act. These limits do not specifically apply to removal actions authorized under CERCLA Section 104(b) that are not financed by Superfund monies, such as the proposed action. However, they are considered as guidelines for such actions. These limits may be waived for actions for which a continued response is either required to mitigate an immediate risk, e.g., for an emergency situation, or is otherwise appropriate and consistent with site remediation. The proposed removal action satisfies the second waiver condition because the current strategy for site remediation, as presented in the project work plan, includes management of these contaminated structures (Peterson et al. 1988).

3.2 SCOPE AND PURPOSE

The scope of the proposed removal action can be broadly defined as management of the contaminated structures at the Weldon Spring site. The primary purpose of the action is to limit the potential for contaminant releases into the environment from the chemical plant structures. The specific objectives of this action are listed as follows.

- Reduce the potential health and environmental hazards of radiation exposure associated with radioactively contaminated dust, equipment, building surfaces, and roofing material;

- Reduce the potential health and environmental hazards of chemical exposure associated with PCB-contaminated floors and asbestos-containing siding, ceiling, roofing, floor tile, pipe insulation, and equipment wrapping;

- Minimize the potential health and safety hazards to on-site personnel from deterioration of the contaminated structures;

- Minimize potential health and environmental hazards associated with releases from related subsurface structures (such as tanks and sewer lines); and

- Facilitate subsequent response activities at the Weldon Spring site by allowing for additional characterization of the waste associated with these structures and removing a physical impediment to comprehensive site cleanup.

3.3 SCHEDULE

The proposed action is scheduled to begin in October 1991 and to be completed within several years, pending approval of the activity sequencing and the availability of funds. The primary scheduling objectives are to complete the action as expeditiously as possible in order to support the project's overall decision-making process and to collect the additional data needed to support the timely implementation of subsequent response actions. The schedule for the proposed action is discussed further in Section 5.6.

3.4 COMPLIANCE WITH REGULATORY REQUIREMENTS

The proposed action would be conducted in accordance with applicable or relevant and appropriate requirements (ARARs). As described in EPA guidance, ARARs can be divided into three categories: (1) location-specific, (2) contaminant-specific, and (3) action-specific. Location-specific ARARs are based on the specific setting and nature of a site, e.g., location in a floodplain and proximity to wetlands or the presence of archeological resources and historic properties. Contaminant-specific ARARs address certain chemical species or a class of contaminants (e.g., uranium or PCBs, respectively) and relate to the level of contamination allowed for a specific pollutant in a specific medium (e.g., soil, water, or air). Action-specific ARARs relate to specific response actions (removal or remedial actions) that are proposed for implementation at a site, e.g., incineration standards for organically contaminated soil. Thus, potential ARARs for action(s) proposed at a site are determined on the basis of factors specific to that site and the individual action(s).

The preliminary identification of potential ARARs for the proposed removal action is based on the nature of the contamination (radioactively and chemically contaminated structures and equipment), the location of the structures (in a previously disturbed area not within a floodplain), and the specific scope of the preferred alternative (see Chapter 5). In addition to ARARs, other requirements that may play a role in the selection and implementation of a preferred alternative are "to-be-considered" (TBC) requirements. These TBC requirements, e.g., individual agency or departmental standards (such as DOE Orders), are not promulgated by law but may have direct bearing on the proposed action. Potential requirements for the removal action proposed in this EE/CA are identified in Appendix B. An overview of the major ARARs as they apply to this action is presented in Section 5.5.

4 REMOVAL ACTION ALTERNATIVES

Alternatives for the proposed action were developed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (EPA 1990b) and EPA's guidance on removal actions. In addition, alternatives for interim actions must remain within the constraints of the Council on Environmental Quality's regulations for NEPA compliance for interim actions while an EIS is in progress. The two requirements that must be satisfied, as given in Section 1506.1 of Title 40 of the *Code of Federal Regulations* (CFR), are (1) that the action be justified independently of the EIS and (2) that the action not prejudice the ultimate decision to be made in the EIS.

4.1 IDENTIFICATION OF ALTERNATIVES

Because of the limited scope of this proposed action (i.e., management of contaminated structures at the Weldon Spring site), only three alternatives are considered appropriate:

- Alternative 1: Expedited dismantlement of the structures. This alternative would involve (1) removal of loose radioactively and chemically contaminated material from the structures to the extent feasible, (2) removal of equipment and other material currently present in the structures, (3) dismantlement of the structures by means of conventional techniques, and (4) placement of resultant material into temporary storage on-site. Most of this material would be stored at the MSA where it would be sorted and characterized; other on-site temporary storage areas would be used in accordance with the site's waste management plan. Material that meets the criteria for release without radiological restrictions and that has a resource recovery value could be released for off-site salvage. A decision on the ultimate disposition of the stored material would be included in the record of decision for comprehensive site cleanup; this decision would be based on analyses provided in the RI/FS-EIS currently being prepared.

- Alternative 2: Delayed action until the record of decision for the RI/FS-EIS is issued.

- Alternative 3: No action.

Other alternatives could be considered for managing these structures, i.e., the structures could be decontaminated but not dismantled, or the structures could be dismantled without being decontaminated. These alternatives were not considered reasonable because the safety hazards posed by these structures can be eliminated only if the structures are removed and because dismantlement without decontamination could result in the release of excessive amounts of radioactive and chemical contaminants to the atmosphere during dismantlement. Hence, neither of these two alternatives was considered further in this evaluation.

4.2 EVALUATION OF ALTERNATIVES

In accordance with EPA guidance and the NCP, removal action alternatives are evaluated with respect to three broad criteria:

- Effectiveness, in terms of protecting human health and the environment in both the short term and the long term.
- Implementability, in terms of
  - Time required for implementation;
  - Technical feasibility, considering technology-specific and site-specific factors and applicability to project goals; and
  - Responsiveness to institutional considerations such as EPA, state, and community acceptance and consistency with specific project requirements (e.g., budget, schedule, and efficient performance of the overall remedial action planned for the site).
- Cost, in terms of capital costs and operation and maintenance costs.

No action (Alternative 3) was eliminated from further consideration because the risks posed by these structures would remain unmitigated under this alternative. The existing threat of environmental releases would continue, as would the safety hazards posed to on-site personnel. Similar impacts are associated with Alternative 2 during the delay period. In addition, the no-action alternative is inconsistent with current plans for comprehensive remediation of the Weldon Spring site.

Timing is the only difference between Alternatives 1 and 2. Relative to activities that would be conducted, these alternatives are essentially the same; that is, the structures would be decontaminated and dismantled under both of the action alternatives. Hence, the evaluation of these two alternatives focuses on their ability to facilitate completion of site cleanup activities, i.e., emphasizing the implementability criterion.

Alternative 1 would reduce current safety hazards and the threat of environmental releases associated with site structures and would support future cleanup actions. The contaminated material would be placed in controlled storage, thus greatly reducing the likelihood of future releases to the environment. In addition, the contaminated material associated with these structures could be more easily characterized while in temporary storage, and these data could be used to support future waste management decisions. Further, subsurface areas at the site could be more easily characterized if the structures were removed. In contrast, Alternative 2 would not facilitate site cleanup because actions needed to address these structures and support future waste management decisions would be delayed. Potential health and environmental impacts associated with the activities of expedited action and delayed action are discussed in Chapter 6.

4.3 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

From the considerations presented in Section 4.2, Alternative 1 — expedited dismantlement of site structures — has been identified as the preferred alternative for the proposed removal action. Alternative 1 would reduce potential adverse impacts to worker safety and would minimize potential risks to human health and the environment associated with contaminant releases from these structures. This alternative can be implemented by means of standard engineering practices and equipment, and it is cost-effective. In addition, Alternative 1 is consistent with and would contribute to efficient performance of the overall remedial action being planned for the Weldon Spring site. Under this alternative, contaminated material associated with these structures would be placed in temporary storage on-site (e.g., the MSA and Building 434), which is consistent with the site's waste management plan. Additional characterization of this material could be efficiently performed, as needed, to support future waste management decisions. Alternative 1 also satisfies the two criteria for interim actions while an EIS is in progress because the structures currently present safety hazards to on-site personnel and represent potential exposure hazards to both on-site and off-site individuals (i.e., the action is justified). Also, this alternative does not prejudice future decisions or limit the choice of reasonable alternatives because management of material associated with these structures is deferred to the record of decision for comprehensive site cleanup (for which an EIS is being prepared).

5 DESCRIPTION OF THE PROPOSED ACTION

The preferred alternative for the proposed action, Alternative 1 -- expedited dismantlement of site structures -- was selected on the basis of the evaluation of alternatives provided in Chapter 4. This alternative would involve (1) removing loose radioactively and chemically contaminated material from the structures to the extent feasible, (2) removing equipment and other material from the structures, (3) dismantling the structures by means of conventional techniques, and (4) placing the resultant material in temporary storage on-site. Material that meets the criteria for release without radiological restrictions and has resource recovery value could be released for off-site salvage.

An observational approach would be used to implement the proposed action. Under this approach, the exact sequence of procedures used to decontaminate and dismantle the structures would be dictated by field conditions. That is, work plans would be prepared prior to initiating activities, and the detailed procedures identified in these plans would be adjusted in response to changing conditions as the work proceeded. This approach would allow for waste segregation as the structures were being dismantled and for interactive use of engineering controls to minimize airborne releases, e.g., by implementing activity-specific controls as indicated by monitoring results. Use of this approach would also reduce the likelihood for occupational injuries and fatalities because it would permit responsiveness to ongoing health and safety concerns as work progressed.

The proposed action is similar to two other actions that have already been conducted at the site, i.e., the decontamination and dismantlement of Buildings 401 and 409. The activities that would be performed to implement the proposed action are similar to those followed during the previous actions; these activities are described in Sections 5.1 through 5.3. Because work plans would be prepared to address engineering specifics and an observational approach would be used, details of exact procedures are not presented in this document and certain actions may vary somewhat from those described herein.

5.1 DECONTAMINATION AND DISMANTLEMENT ACTIVITIES

Decontamination activities would be similar for most of the structures addressed under the proposed action. The first step would be to seal all floor openings (e.g., with grout or mechanical plugs) to prevent material from reaching subsurface pipes such as the sanitary sewer system. The next activity would be to remove loose interior material and small equipment. These items would be decontaminated or sealed, as necessary, to prevent the migration of loose contamination and would then be transported to the MSA for temporary storage. Following the removal of these items, interior dust and loose contamination would be removed from the structures by aggressively vacuuming and wiping horizontal surfaces such as floors, windowsills, and overhead beams as well as the exteriors of equipment, piping, and other accessible areas where dust has accumulated. Vacuum equipment would exhaust through high-efficiency-particulate-air (HEPA) filters in order to minimize the airborne release of contaminants during dust-removal activities. Contaminated material resulting from these activities would be placed in temporary storage on-site (e.g., the MSA and Building 434), which is consistent with the site's waste management plan.

After removing loose contamination from the structures, chemically contaminated surfaces would be cleaned. For example, mercury would be removed by means of high-suction vacuum equipment with a HEPA filter exhaust system, and PCBs would be removed by means of a solvent wipe procedure. The resulting contaminated material would be containerized and transported to Building 434, where chemically hazardous waste is currently being stored. Asbestos-containing material would then be removed from the structures, containerized (e.g., in plastic bags or boxes), and placed in temporary storage on-site. The estimated volumes of asbestos-containing material in the various buildings are given in Table 6. Contamination remaining on floors and free liquid in pipes and tanks would be removed, consolidated, containerized, and placed in controlled storage on-site. The vessels would be sealed to ensure that any contamination remaining therein would be contained and that water would not enter the emptied vessels while in temporary storage.

The equipment remaining within each structure (e.g., large process vessels and hoppers) would be surveyed for contamination, decontaminated or sealed to prevent the spread of removable contamination, and moved to the MSA for temporary storage; large pieces of equipment might be removed concurrently with building dismantlement. The procedures used to remove the equipment would depend upon the size and physical characteristics of individual components. For example, pipes would be cut into manageable lengths to facilitate transport to the MSA, but process vessels would likely be removed intact. The structures would be kept as clean as possible during this process (i.e., areas that are currently inaccessible due to the presence of process equipment and stored material would be decontaminated as the equipment and material were removed). Local ventilation would be used as needed, and the work area would be continuously monitored for airborne contamination. Engineering controls would be increased as indicated by the monitoring results.

After removing equipment from the structures and decontaminating the various surfaces, as appropriate (e.g., to remove loose contamination), the structures would be dismantled. Most of the structures associated with this action are buildings (see Table 1). Other structures include an Imhoff tank (i.e., a septic tank) at the Building 427 location, railroad tracks and ballast, and a diesel switching engine. These facilities would be removed and/or dismantled by means of standard engineering procedures and equipment. Management of these other structures is not expected to be difficult or to present significant health or safety concerns; consequently, they are not addressed further in this document. Prior to initiating the response action, detailed work plans would be developed for all of the structures associated with this action. The following discussion focuses on procedures that would be used to dismantle the various chemical plant buildings.

Because many buildings are unique in terms of construction type and past use, dismantlement methods would vary with both building type and configuration. Four main categories of buildings have been identified at the site:

- Multilevel process buildings with a high bay, flat roof, and asbestos-cement siding that contain process equipment, e.g., Buildings 201 and 301 (Building 101 is similar except that most process equipment has been removed);

- Multilevel process buildings with a gable aluminum roof and aluminum siding that do not contain process equipment, e.g., Buildings 103 and 105

(Buildings 403 and 404 are similar except that they contain process equipment);

- Single-level auxiliary buildings with a flat roof and masonry exterior walls (e.g., Buildings 406, 407, 408, 410, and 430); and

- Single-level steel-frame utility buildings (e.g., Buildings 108, 109, 110, 405A, 414, 429, and 432).

These four categories are considered representative of the various buildings that exist at the site, although some variability exists. For example, several of the buildings (e.g., Buildings 431 and 432) also have belowground structures.

The dismantlement of multilevel, flat-roofed process buildings would begin by removing yard structures and various exterior equipment and machinery that could restrict equipment mobility and wall-removal operations. Following equipment removal and decontamination activities (discussed previously), the roof and walls would be removed to expose the building's structural-steel framework. Once this activity was completed, interior partitions would be demolished and reduced to rubble, after which miscellaneous steel used for catwalks, stairs, and grating would be cut away and removed. In conjunction with or following removal of the structural framework, any remaining large pieces of equipment would be removed. Finally, after removing debris and rubble from the building, exposed floor openings (e.g., those leading to buried utility lines) would be sealed.

This activity sequence may need to be repeated several times for large buildings with low bays and attachments flanking the high bays. By first removing the lower structures, it would be possible to bring equipment in close to work on the high bay structures.

Major equipment that would be used for dismantlement activities includes the following:

- Crawler crane -- for lifting supplies and lowering materials to the ground;

- Hydraulic crane -- for lighter lifting and basket operations;

- Skid-steer loader -- for a variety of loading and moving tasks;

- Tracked loader -- for pulling, lifting, and loading operations;

- Hydraulic excavator equipped with a cutting shear -- for cutting structural steel;

- Hydraulic concrete breaker -- for breaking concrete walls and floors;

- Flat-bed tractor trailer -- for transporting equipment and other material to on-site storage facilities (e.g., the MSA and Building 434);

- Dump truck -- for transporting building rubble to the MSA; and

- Water truck -- for providing water for dust control.

Also, at least one piece of equipment with a grapple attachment would be used to facilitate lifting and moving operations. Small dismantlement tools would include cutting torches, jack hammers and pavement breakers, abrasive saws, portable generators, compressors and air tools, and hand tools.

The procedures used to dismantle multilevel, gable-roofed process buildings would be similar to those used for the multilevel, flat-roofed process buildings discussed above. The dismantlement sequence would be to first remove siding, then roofing, then miscellaneous interior metal. The next step would be to demolish interior partitions. Finally, the structural-steel framework would be toppled, beginning with the low bays and working inward to the high bays. Hydraulic shears would be used extensively to remove the structural steel.

The dismantlement sequence for single-level, flat-roofed auxiliary buildings would consist of removing yard structures and roof-mounted equipment, removing exterior masonry walls, toppling and cutting up structural framework, and removing construction debris and rubble. A demolition grapple mounted on a large hydraulic excavator would be capable of demolishing most, if not all, of the single-level auxiliary buildings associated with the proposed action. If this technique were used, stringent dust-control measures would be implemented to ensure worker protection.

Single-level steel-frame buildings could be dismantled by selective cutting to weaken the structural supports, followed by pulling or pushing the building down and additional cutting (with a hydraulic shear mounted on an excavator) to facilitate transport and storage. Alternatively, the structure could be dismantled by removing siding and roofing and toppling the structure by section, then cutting the material into transportable pieces.

In general, foundation removal is not part of the proposed action but will be addressed in the RI/FS-EIS. Floor slabs remaining after building dismantlement would be decontaminated to remove loose surficial contamination; this operation would be accomplished with equipment having a self-contained vacuum and filtration unit to minimize potential airborne releases. For certain buildings, belowground structures would be removed either in sections or intact. Work plans would be developed during the detailed engineering phase of this action to address specific conditions of each structure.

Some areas of soil adjacent to certain buildings are radioactively contaminated as a result of prior plant activities. These areas could be excavated concurrently with building dismantlement if it were determined that tracking or other dispersal of soil contaminants could be caused by the dismantlement activities. In accordance with the plan for such material at the Weldon Spring site, the excavated soil would be controlled and stored on-site pending the comprehensive disposal decision for the project.

Good engineering practices and mitigative measures would be implemented to minimize erosion and transport of soil from exposed work areas. These include limiting the size of the work area and using silt fences, straw bales, and sediment traps. Surface runon and runoff controls would be implemented to control and direct the amount of surface water entering the work area, thereby minimizing the amount of water that could contact contaminated material. Water collected as part of this action would be managed in accordance with the site's National Pollutant Discharge Elimination System (NPDES) permit established with the state of Missouri. Water meeting the discharge requirements of the permit would be released off-site through a permitted outfall. Water not meeting permit requirements would be treated as appropriate, e.g., in the site water treatment plant, prior to release off-site. If the on-site water treatment plant were not yet operational when structure dismantlement activities began, contaminated water resulting from this action would be impounded on-site until the plant became operational.

5.2 MATERIAL STAGING AREA

Material resulting from the proposed action would be temporarily stored on-site, pending the upcoming disposal decision for all material resulting from sitewide cleanup activities; analyses to support this decision are presented in the RI/FS-EIS that is currently in preparation. Most of the material generated by decontaminating and dismantling site structures would be stored in the MSA, which is currently being constructed in the northern portion of the site as part of an earlier response action for the project (Figure 4). The active life of the MSA is projected to be about 10 years.

The MSA consists of two sections, one for material known to be contaminated above criteria for release without radiological restrictions and the other for material that must be analyzed further to determine whether it can potentially be released for use without radiological restrictions. Material to be stored in the MSA includes structural metal, equipment, concrete rubble, and decontamination debris. As currently planned, the MSA would be constructed in three phases; the first phase has already been initiated (to support a previous action), and the second and third phases of the MSA would be constructed to provide additional storage capacity, as needed. Implementation of the proposed action would necessitate these two additional phases of the MSA. The design capacity of the three-phased MSA is about 73,000 m^3 (95,000 yd^3).

The MSA has been designed to ensure that contaminated material resulting from response actions at the site (such as that currently proposed) can be safely stored on-site until the final disposal decision is made. For example, the facility foundation has been designed to ensure structural stability and to support the waste material, the cover, and any equipment used on the area. The MSA is located above the seasonal high water table and is being underlain by recompacted, fine-grained soil; it will be covered as appropriate to minimize infiltration and potential contaminant migration into the nearby environment during the active life of the facility. To minimize potential contaminant migration to the subsurface, soil will also be recompacted in adjacent areas (MK-Ferguson Company and Jacobs Engineering Group 1990c.)

The MSA design also minimizes surface water runoff and runon. An internal runoff and leachate collection system, consisting of perforated pipes and gravel-filled drainage ditches, would remove precipitation that falls on the MSA as well as any leachate that might be generated. Collected water would be contained in an adjacent siltation pond and managed in accordance with the site's NPDES permit. A dike is being constructed around the active portion of the MSA to serve as both a surface water runon/runoff control system and a retaining wall. The dike is designed to prevent surface water flow onto the active portion of the MSA that could result from a 25-year, 24-hour storm (i.e., 14 cm [5.7 in.] of rain over a 24-hour period). Contaminated material subject to wind dispersal would be covered while in storage at the MSA.

5.3 MITIGATIVE MEASURES

The proposed action incorporates specific planning and implementation measures designed to reduce potential adverse effects on human health and the environment. The major mitigative measures associated with this action are summarized in Table 7.

5.4 MONITORING AND CONTINGENCY PLANS

Air would be monitored in the general work area and in the worker's breathing zone to ensure the safety of personnel implementing this action and to evaluate the effectiveness of engineering controls. Parameters monitored under this program would include radon gas and decay products, airborne radioactive particulates, asbestos, volatile organic compounds, PCBs, dust, and welding fumes (i.e., airborne metals such as silver, cadmium, chromium, copper, iron, nickel, manganese, and zinc). Engineering controls and respiratory protective equipment would be used to ensure that workers were not exposed to excessive levels of airborne contaminants.

Air at the site perimeter and at nearby receptor locations is currently being monitored as part of the routine environmental monitoring program for the Weldon Spring site (see MK-Ferguson Company and Jacobs Engineering Group [1991] for monitoring locations). Airborne contaminants are not expected to increase above current levels at the site perimeter as a result of implementing the proposed action. If elevated levels were detected at the site perimeter during the decontamination and dismantlement activities, more stringent engineering controls would be implemented to ensure the protection of human health and the environment off-site during the action period.

The proposed action would be conducted in accordance with health and safety plans that have been developed to ensure worker protection for the project. Additional plans that address components specific to this action would be developed, as appropriate, during the detailed engineering phase. These plans would include requirements for expected conditions as well as for anticipated responses to abnormal situations (e.g., increased levels of airborne emissions) or emergency situations (e.g., accidents).

5.5 COMPLIANCE WITH REGULATORY REQUIREMENTS

The major concerns associated with the proposed action are those related to protecting workers and minimizing airborne emissions to control off-site releases. All activities would be conducted in accordance with pertinent worker-protection requirements of the Occupational Safety and Health Administration Standards for Hazardous Waste Operations and Emergency Response (29 CFR Part 1910). These requirements are not considered in the formal ARAR evaluation process because they are part of an employee protection law with which CERCLA response actions must comply, as specified in the NCP. Worker exposure to airborne asbestos fibers would also be maintained within the permissible limits promulgated under the Toxic Substances Control Act.

The proposed action would be conducted in accordance with DOE Orders and all pertinent ARARs for protecting human health and the environment. The DOE Orders most significant to the proposed action are listed in Table 8. Specific requirements of certain of these

TABLE 7 Major Mitigative Measures for the Proposed Action

Factor	Features
Dust control	Openings in floors, walls, ceilings, and roofs would be sealed to the extent feasible to prevent airborne releases outside of structures during decontamination activities. Localized ventilation would be used in heavily contaminated buildings, as needed, to minimize contaminant releases to the environment. Contaminated equipment and vessels would be sealed prior to removal and transport to the MSA to eliminate airborne releases from any residual contamination. Dust would be controlled primarily with wet methods (e.g., water sprays) during dismantlement activities. Material that is subject to airborne emissions, such as friable asbestos-containing material, would be packaged prior to placement in temporary storage. Material that is subject to wind erosion would be containerized and/or covered in the MSA or stored within an existing building, in accordance with the site's waste management plan.
Decontamination	Activities would be sequenced to minimize worker exposure and potential environmental releases. Industry-proven techniques would be used to ensure efficient utilization of time and resources. These techniques include vacuuming and wet wiping of accessible surfaces containing dust and loose contamination. Vacuum exhaust would be discharged through a HEPA filter to minimize airborne emissions.
Dismantlement	Activities would be sequenced and an observational approach would be followed to minimize the physical hazards associated with dismantlement activities. Heavy equipment would be used to the maximum extent possible to reduce the likelihood of accidents that could result in personal injury.
Temporary storage	Waste resulting from implementation of the proposed action would be stored on-site. The MSA has been designed and would be operated to minimize the likelihood of environmental releases. (See also the discussion for dust control and erosion control in this table.)
Equipment inspection	Equipment would be routinely inspected during operations. Equipment would not be allowed to leave the controlled area without being checked for contamination and would be decontaminated if necessary.
Noise control	Vehicle mufflers and other equipment would be checked periodically and maintained in good condition.
Surface water management	Surface water would be managed to minimize contaminant releases to nearby areas. Runon and runoff control systems would be constructed to minimize water contact with contaminated material.

TABLE 7 (Cont'd)

Factor	Features
Erosion control	Good management practices and engineering controls – such as silt fences, straw bales, and sediment traps – would be used to minimize erosion, e.g., during soil excavation activities.
Environmental monitoring	Air would be monitored for particulates in the work area, as appropriate; radionuclides in the work area and at the site perimeter during the entire action period; asbestos in the work area and site perimeter during asbestos removal activities; and other contaminants (e.g., volatile organic compounds, PCBs, and welding fumes) in the work area, as required. Appropriate responses, such as increasing engineering controls, would be implemented as indicated by monitoring results. In addition, collected surface water would be monitored to ensure compliance with the NPDES permit for the site. Appropriate responses, such as treating collected water in the site water treatment plant prior to release off-site, would be implemented as indicated by monitoring results.
Protection of workers	The work environment would be continually monitored, and protective equipment such as coveralls, gloves, and respirators would be used as needed. Plans for the use of personal protective equipment would be detailed in health and safety plans prepared specifically for this proposed action.
Protection of the general public	Air would be monitored in the general work area and at the site perimeter, and appropriate responses such as increasing engineering controls would be taken if measured contaminant levels at the site perimeter increased above current levels. Access to work areas would be restricted. Contaminant releases to air and surface water off-site would be minimized by implementing appropriate engineering controls to minimize contaminant releases to the environment.
Emergency preparedness	An emergency preparedness plan is currently in place for the project. This plan includes provisions for responding to emergency situations such as spills, tornadoes, earthquakes, fires, explosions, and accidents with injuries. The project maintains a trained emergency response team that is responsible for minimizing potential adverse impacts to human health and the environment that could result from emergency situations. This team would be available during the proposed action.

TABLE 8 Major DOE Orders Pertinent to Implementing the Proposed Action

DOE Order	Title
5400.1	General Environmental Protection Program
5400.3	Hazardous and Radioactive Mixed Waste Management
5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements
5400.5	Radiation Protection of the Public and the Environment
5440.1D	National Environmental Policy Act Compliance Program
5480.1B	Environment, Safety, and Health Program for Department of Energy Operations
5480.4	Environmental Protection, Safety, and Health Protection Standards
5480.8	Contractor Occupational Medical Program
5480.9	Construction Safety and Health Program
5480.10	Contractor Industrial Hygiene Program
5480.11	Radiation Protection for Occupational Workers
5481.1B	Safety Analysis Review System
5482.1B	Environmental Protection, Safety, and Health Protection Appraisal Program
5483.1A	Occupational Safety and Health Program for DOE Employees at Government-Owned Contractor-Operated Facilities
5484.1	Environmental Protection, Safety, and Health Protection Information Reporting Requirements
5000.3	Unusual Occurrence Reporting System
5500.2	Emergency Planning, Preparedness, and Response for Operations
5820.2A	Radioactive Waste Management

Orders are presented in Appendix B. The only material that may be transported off-site as a part of this action is that which meets criteria for release without radiological restrictions and has a resource recovery value. The criteria provided in DOE Order 5400.5 and U.S. Nuclear Regulatory Commission guidelines would be used to determine which materials are potentially releasable for reuse without radiological restrictions (see Table B.3 of Appendix B). These criteria have been accepted by EPA Region VII and the state of Missouri as being appropriate for use at the Weldon Spring site. Because this action would be conducted entirely on-site, it is considered an on-site action within the meaning of CERCLA and the NCP (see the introduction to Appendix B).

The major ARARs associated with the proposed action are highlighted in the following discussion. Consistent with EPA guidance, these ARARs are grouped on the basis of location-specific, contaminant-specific, and action-specific requirements. Additional discussion of these and other regulatory requirements with which the proposed action would comply is provided in Appendix B.

5.5.1 Location-Specific Requirements

No location-specific requirements are expected to be pertinent to the proposed action because this action is not expected to impact floodplains, wetlands, critical habitats, or cultural resources (see Table B.1 in Appendix B).

5.5.2 Contaminant-Specific Requirements

Potential contaminant-specific requirements considered for the proposed action include those promulgated under the Clean Air Act, such as the National Emission Standards for Hazardous Air Pollutants (NESHAPs) and the National Ambient Air Quality Standards (NAAQS). The NESHAPs requirements are codified in 40 CFR Part 61, and the NAAQS requirements are codified in 40 CFR Part 50. The NESHAPs requirements for radionuclides (given in 40 CFR Part 61, Subparts H and Q) and those for asbestos (given in Subpart M) are considered ARARs for this action.

The NAAQS are not considered ARARs because they do not apply directly to source-specific emissions; rather they are national limitations on ambient air concentrations (see Table B.2 of Appendix B). However, the implementation plan prepared by the state of Missouri to address air quality does provide certain source-specific emission limitations; hence, some state requirements are considered pertinent to the proposed action. Specific requirements promulgated under Missouri air pollution control regulations include those in Section 10-5.100 of Title 10, *Code of State Regulations* (CSR), which pertain to the control of airborne particulate emissions, and those in 10 CSR 10-5.180, which pertain to the control of particulate emissions from internal combustion engines. These requirements are considered ARARs for the proposed action.

Additional contaminant-specific requirements considered for the proposed action include those for radon-222, as promulgated under the Uranium Mill Tailings Radiation Control Act (UMTRCA). In accordance with these requirements, radium-contaminated material that would result from implementing this action would be stored in a manner such that radon-222 releases would not (1) exceed an average release rate of 20 pCi/m^2-s or (2) increase the annual average concentration of radon-222 in air at or above any location outside the site perimeter by more than 0.5 pCi/L. Compliance with these requirements would not be difficult because very little radium-contaminated material would result from the proposed action.

5.5.3 Action-Specific Requirements

The major action-specific requirements considered for the proposed action address interim management of radioactively and chemically contaminated material. Radioactive material would be managed in accordance with the requirements identified in DOE Order 5820.2A and UMTRCA. The management of chemically hazardous material is addressed under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (see Table B.3 of Appendix B). The application of specific RCRA requirements to this action cannot be determined until chemical characterization activities currently under way are completed. Each structure would be reviewed for components such as process tanks and pipes that could potentially contain RCRA material. Chemically contaminated material that meets the RCRA definition of hazardous waste would be stored in an on-site facility designed to comply with the substantive storage requirements of RCRA, unless an appropriate waiver condition applied. Mixed radioactive and chemically hazardous waste would be managed in compliance with DOE Order 5400.3. The DOE will coordinate the application of RCRA to this action with the state of Missouri.

5.6 SCHEDULE

The proposed action is scheduled to be initiated in October 1991 and to take several years to complete. Most activities would be performed in 1992 and 1993. Some site structures are currently being used to support ongoing response actions. For example, Building 434 is being used as a storage area for RCRA hazardous waste. The schedule for dismantling this building, and any other structures that may be used to support interim response actions, is tied to the overall schedule for the project. As currently planned, all structures addressed in this proposed action would be decontaminated and dismantled by 1998.

The schedule for the proposed action exceeds the statutory limit of 1 year for Superfund-financed removal actions (Section 3.1). However, this limit does not apply to the proposed action because response actions at the Weldon Spring site are not financed by Superfund monies. In addition, this action satisfies the condition identified in the NCP for waiving the statutory time limit; that is, completion of the proposed action is appropriate and consistent with the remedial action currently planned for the site.

5.7 COST

The cost of implementing the proposed action is estimated to be $45 million. This cost greatly exceeds the statutory limit of $2 million for Superfund-financed removal actions (Section 3.1). However, the general statutory limits for removal actions do not apply to this action, and the proposed action satisfies the waiver condition for such limits, as described in Section 5.6.

6 POTENTIAL IMPACTS OF IMPLEMENTING THE PROPOSED ACTION

Implementing the proposed action could result in impacts to human health and the environment. Potential health impacts to the general public and workers are evaluated in Section 6.1, and potential environmental impacts are evaluated in Section 6.2. Potential cumulative impacts associated with conducting this action in combination with other actions currently planned for the site are addressed in Section 6.3 to ensure that the sum of the impacts associated with individual actions would not result in an unacceptable overall threat to human health and the environment.

6.1 POTENTIAL HEALTH IMPACTS

6.1.1 General Public

The air pathway is the principal means by which members of the general public could be exposed to radioactive and chemical contaminants as a result of implementing the proposed action. To control this potential exposure, the site structures would be decontaminated and dismantled in a manner that would minimize the likelihood of airborne releases. Loose radioactive contamination, asbestos-containing material, PCB contamination, and material and equipment currently located within the structures would be removed prior to dismantlement in order to minimize airborne releases of contaminated material. Waste resulting from the decontamination and dismantlement activities would be containerized, as appropriate, prior to transport to an engineered storage facility on-site. Stringent engineering controls would be implemented during each of these activities such that no increase in airborne contaminant concentrations would be expected at the site perimeter.

Radon gas, radioactive particulates, and external gamma exposure rates are measured at the site perimeter as part of the project's ongoing environmental monitoring program. The measured values are currently indistinguishable from those at nearby background locations. If levels of radioactive or chemical contaminants increased above current levels at the site perimeter during implementation of the proposed action, more stringent engineering measures would be implemented so that off-site releases would be effectively controlled. Hence, no member of the general public is expected to receive an incremental radiation dose via the air pathway as a result of this action.

Similarly, no exposures of the general public are expected via the surface water pathway because potentially contaminated surface water (e.g., wash water) would be retained on-site and monitored to ensure compliance with the site's NPDES permit. Water that does not meet the permit requirements would be treated as appropriate, e.g., in the site water treatment plant, prior to release. All surface water released from the site would be discharged through permitted outfalls, in compliance with the permit.

6.1.2 Workers

Exposures of workers conducting the action would be kept as low as reasonably achievable (ALARA) by following standard health physics and industrial hygiene practices and maintaining strict compliance with worker-protection requirements, including DOE limits for occupational exposure. Dust-control measures -- such as vacuuming and directing the exhaust through HEPA filters, wet wiping contaminated surfaces, and using localized ventilation -- would be employed to minimize particulate emissions during implementation of the proposed action. Respiratory protective equipment (e.g., full-face respirators and self-contained breathing units) would be used if such dust-control measures did not maintain airborne contaminant concentrations at acceptably low levels.

Both the general work area and the breathing zone would be monitored for radioactive and chemical contaminants as part of a comprehensive contaminant detection and mitigation system. Asbestos- and PCB-handling activities would be conducted in accordance with safe work practices and regulatory requirements to ensure the protection of workers on-site and to minimize potential contaminant releases off-site.

Use of engineering controls and safe work practices has effectively minimized worker exposures during activities conducted to date. Airborne gross alpha activity was measured in the work area during the previous dismantlement of Buildings 401 and 409, as well as during removal of overhead piping. The measured gross alpha concentration was generally less than 1×10^{-13} µCi/mL, which is much lower than the related derived air concentration (DAC) for controlling radiation exposures to workers at DOE facilities; the DAC for uranium isotopes is 2×10^{-11} µCi/mL. The contaminant levels in these two buildings were lower than those in most of the structures addressed in the proposed action. Therefore, higher airborne concentrations are likely to occur in the work area during decontamination activities performed as part of this action. However, the extremely low airborne concentrations measured during the dismantlement of Buildings 401 and 409 were due to the effectiveness of engineering controls and safe work practices. Similar engineering controls and safe work practices would be used for this action.

The level of contamination in the structures addressed by the proposed action is highly variable, ranging from minimal (if any) contamination in auxiliary structures to considerable contamination in the process buildings (see Tables 2 through 6). The potential for worker exposure to radioactive and chemical contaminants would be highest while the structures were being decontaminated. Although respiratory protective equipment would be used during decontamination activities, inhalation exposure could potentially result from an operator error or equipment malfunction. The potential radiation dose to a worker decontaminating the site structures (the maximum potential exposure activity) is evaluated as follows.

It is assumed that the worker is involved in decontamination activities for 1 year (i.e., 2,000 work hours), during which time the worker is exposed to an average gamma exposure rate of 0.1 mR/h and is inhaling uranium-contaminated dust at an airborne concentration of 1×10^{-12} µCi/mL. This uranium concentration is representative of measured concentrations in the more highly contaminated buildings (see Table 3). Although airborne dust concentrations would increase during decontamination activities, specific procedures would be used to ensure a safe work environment (e.g., dust-control measures would be applied and workers would be supplied with respiratory protective equipment during activities that could generate significant amounts of dust). Hence, this airborne concentration -- which is 5% of the uranium DAC -- is considered representative of that to which a worker could potentially be exposed.

The worker is also assumed to be exposed to a radon-220 decay product concentration of 0.1 WL and a radon-222 decay product concentration of 0.01 WL for 100 hours during the year. These radon concentrations are representative of those currently measured in these buildings (see Table 4) and include the contribution from natural sources of radon (such as radium naturally present in soil). Radon concentrations are elevated above background in only a few of the buildings addressed in this proposed action. The concentrations of radon decay products in these buildings would decrease to background levels following removal of the thorium and radium material from which radon-220 and radon-222 are generated. Hence, it is assumed that the worker is exposed to elevated concentrations of radon decay products for 100 hours per year. This exposure is considered a reasonable but conservative estimate of the potential worker exposure that could be incurred because the worker would use respiratory protective equipment (e.g., a full-face respirator) while working in areas where concentrations of radon decay products are elevated.

The annual radiation exposures and resultant risks of cancer induction for this hypothetical worker are given in Table 9. The radiation dose from external gamma exposure and inhalation of contaminated dust is estimated to be 490 mrem/yr. The radon decay product exposures associated with the proposed action are 0.059 WLM/yr for radon-220 decay products and 0.0059 WLM/yr for radon-222 decay products. These radon decay product exposures correspond to an effective dose equivalent of 26 mrem/yr (based on dose factors given in Publication 32 of the International Commission on Radiological Protection [ICRP 1981]). Hence, the total radiation dose to this hypothetical worker is estimated to be about 520 mrem/yr, which is well below the DOE occupational dose limit of 5,000 mrem/yr given in DOE Order 5480.11. This radiation exposure would result in an annual incremental lifetime radiological risk of 3.0×10^{-4} (i.e., the risk of cancer induction over the remainder of the worker's lifetime from this 1 year of radiation exposure). Planned use of the ALARA process during decontamination activities would reduce these exposures to lower levels. For purposes of comparison, exposure to natural sources of radiation -- i.e., radon, terrestrial radiation, and cosmic rays — results in an effective dose equivalent of about 300 mrem/yr (National Council on Radiation Protection and Measurements 1987).

An estimated 100 person-years of effort is projected to be required to decontaminate all structures prior to dismantlement. The resultant dose to the entire work force is therefore estimated to be 52 person-rem, and the incremental lifetime radiological risk to this work force is estimated to be 3.0×10^{-2}. Hence, no adverse health impacts to decontamination workers are expected to result from exposure to radioactive contaminants during decontamination activities. Other workers at the site not directly involved in this action could be exposed to airborne contaminants released during decontamination activities. The actual exposures of these workers would depend on their proximity to the structures being decontaminated. The major exposure pathway would be from inhalation of airborne contaminants. The dose to an individual worker not directly involved in this action would not be expected to exceed 1 mrem. The incremental lifetime radiological risk to such a worker is estimated to be 6×10^{-7}. The dose to all on-site workers not directly involved in this action is estimated to be 0.2 person-rem, assuming 200 exposed workers (160 of which are in the on-site office building). The resultant incremental lifetime radiological risk is estimated to be 1.2×10^{-4}. Hence, no adverse health impacts to other on-site workers are expected to result from implementing this action.

Following the removal of loose radioactive contamination, asbestos-containing material, and PCB contamination from the various structures, the major safety concern for workers would be the physical hazard associated with dismantlement activities. The estimated number of occupational fatalities and injuries that could occur during implementation of the proposed action are summarized in Table 10. These values are based on an estimated 300 person-years

TABLE 9 Estimated Radiation Exposures and Health Risks to a Decontamination Worker

Exposure Pathway	Exposure Point Concentration[a]	Annual Exposure	Risk Factor	Risk
External gamma	0.1 mR/h	190 mrem[b]	6×10^{-7}/mrem[c]	1.1×10^{-4}
Inhalation of uranium-contaminated dust	1×10^{-12} µCi/mL	300 mrem[d]	6×10^{-7}/mrem[c]	1.8×10^{-4}
Inhalation of radon-220 decay products	0.1 WL	0.059 WLM[e]	1.2×10^{-4}/WLM[f]	7.1×10^{-6}
Inhalation of radon-222 decay products	0.01 WL	0.0059 WLM[e]	3.5×10^{-4}/WLM[g]	2.1×10^{-6}
Total				3.0×10^{-4}

[a]Certain of these values are not technically concentrations, but they are listed in this column because they represent the intake ("exposure point concentration") assumed for the exposure assessment.

[b]Based on an exposure time of 2,000 h/yr and a dose conversion factor of 0.95 mrem/mR.

[c]Risk of cancer induction based on information given in EPA (1989c).

[d]Based on an inhalation rate of 1.2 m^3/h, an exposure time of 2,000 h/yr, and dose conversion factors given in Gilbert et al. (1989).

[e]Based on an exposure time of 100 h/yr; one working-level month (WLM) is the exposure to 1 WL for 170 hours.

[f]Risk of fatal cancer based on information given in the BEIR IV report of the Committee on the Biological Effects of Ionizing Radiations (National Research Council 1988) and in Publication 32 of the ICRP (1981); in the ICRP report, it is noted that the cancer risk from radon-220 decay products is about one-third of that from radon-222 decay products.

[g]Risk of fatal cancer based on information given in the BEIR IV report (National Research Council 1988).

of effort to dismantle the 30 structures. The estimated total number of occupational fatalities is 0.071, and the estimated total cases of occupational injury is 44, with 20 cases involving lost workdays. The fatality value is based on the incidence rate for occupational fatalities in the construction industry. Even if this assumption results in underestimating the rate for fatalities occurring during the proposed action by as much as a factor of 2, the expected number of occupational fatalities would still be much less than 1. However, such an underestimate appears unlikely because occupational injury rates for heavy construction are about the same as the average for all construction (U.S. Department of Labor 1988, 1990). Also, the average annual incidence rate for fatalities in mining -- the industry sector with the highest rate -- was 29.6 per

TABLE 10 Estimated Number of Occupational Fatalities, Injuries, and Related Lost Workdays Associated with Dismantlement Activities[a]

Category	Estimated Number
Total occupational fatalities	0.071[b]
Total cases of occupational injuries	44[c]
Total cases of nonfatal occupational injuries, without lost workdays	24[c]
Total cases of occupational injuries, with lost workdays	20[c,d]
Total lost workdays from occupational injuries	420[c]

[a]All estimates are based on 300 person-years of effort and on average incidence rates for 1985-1988 calculated from annual estimates provided by the U.S. Department of Labor (1988, 1990). Averages are used to reduce year-to-year variation in incidence rates.

[b]Based on results for the construction industry. Because of the relatively small number of occupational fatalities that occur annually in each category of the construction industry, the incidence rate for fatalities is provided by the Department of Labor only for the construction industry as a whole and not for various categories; the average for the 1985-1988 period is 23.7 fatalities per 100,000 full-time workers.

[c]Based on results for heavy construction, except highways.

[d]Includes cases that involve days away from work, days of restricted activity, or both.

100,000 full-time workers for the period between 1985 and 1988 (U.S. Department of Labor 1988, 1990), which is much less than twice the average rate for construction (i.e., 23.7 per 100,000 full-time workers).

6.2 POTENTIAL ENVIRONMENTAL IMPACTS

The potential environmental impacts on soil and cultural resources, water resources, air quality, and vegetation and wildlife that could result from implementing the proposed action are addressed in Sections 6.2.1 through 6.2.4, respectively.

6.2.1 Soil and Cultural Resources

Implementation of the proposed action would disturb small areas of soil in the vicinity of the various structures being dismantled during the short term. The total area affected by the proposed action is estimated to be about 16 ha (40 acres), including 5.2 ha (13 acres) at the MSA, which has been addressed under an earlier response action. Because these areas were previously disturbed during construction and operation activities at the chemical plant, no long-term adverse impacts are expected for either natural soil or archeological and cultural resources (for the latter, see Weichman 1986).

6.2.2 Water Resources

Implementation of the proposed action is not expected to adversely impact local water resources because relatively small areas would be affected by surface alterations and activities would be located outside the 100-year floodplain. Although dismantlement activities could result in temporary increases of suspended solids in on-site surface water, this water would be managed as part of the proposed action to ensure minimal impacts to off-site surface water. In addition, good engineering practices and mitigative measures would be implemented to control erosion, e.g., silt fences, straw bales, and sediment traps would be used as appropriate. Similarly, potential adverse impacts due to releases from the MSA would be minimized by constructing the storage area with runon/runoff controls and covering stored material as appropriate. Water collected as a result of this action would be managed in compliance with the site's NPDES permit established with the state of Missouri. Water that meets permit requirements would be released through a permitted outfall, and water that does not meet permit requirements would be treated as appropriate, e.g., in the site water treatment plant, prior to release off-site.

6.2.3 Air Quality

Dust released during decontamination, dismantlement, or temporary storage activities could impact air quality in the immediate vicinity of the work area during the short term. The potential for dust generation would be minimized by limiting on-site vehicular traffic and by implementing good engineering practices such as wetting and/or covering exposed surfaces. Activities would be sequenced to minimize the release of contaminated dust to the environment (e.g., wall openings would be sealed prior to decontamination activities such that the structure itself would serve as a release control). In addition, equipment used for decontamination activities would contain appropriate emission control devices (e.g., air would be exhausted through HEPA filters). Additional monitors would be used to determine airborne contaminant concentrations in the work areas to evaluate compliance with requirements for protecting worker health and safety. Airborne concentrations of radioactive and chemical contaminants are not expected to increase at the site perimeter as a result of this action. Contingency plans and tiered engineering controls would be implemented to ensure that air quality off-site is not adversely impacted during the action period.

6.2.4 Vegetation and Wildlife

Adverse impacts to vegetation and wildlife related to noise, visual disturbance, or dust resulting from the proposed action would be minimal. The affected area is primarily composed of buildings and does not provide unique wildlife habitat. Also, local vegetation is mowed, and plant species in the area are not restricted in distribution. Further, the total affected area of about 16 ha (40 acres) is negligible relative to the undeveloped portions of the adjacent Army Reserve property and the thousands of acres of nearby wildlife areas. Animals and vegetation are not likely to be exposed to significant airborne contaminants during the action period because such releases would be controlled. The DOE consulted with the U.S. Fish and Wildlife Service and the Missouri Department of Conservation, and it was concluded that no impacts to threatened or endangered species would occur because the chemical plant area does not provide critical habitat for such species and those that may occupy areas near the site (e.g., the bald eagle) do so only intermittently.

6.3 POTENTIAL CUMULATIVE IMPACTS

The potential cumulative impacts associated with response actions currently planned for the site were assessed to ensure that the sum of the impacts associated with each individual action would not result in an unacceptable overall threat to human health and the environment. Four major activities have been documented for the chemical plant area: (1) construction and operation of a water treatment plant for managing contaminated water in surface impoundments (MacDonell et al. 1990); (2) construction and operation of a temporary storage area (TSA) for the solid bulk waste excavated from the quarry (DOE 1990); (3) construction and operation of the MSA for structural debris from the site (MacDonell and Peterson 1989, 1990), and (4) decontamination and dismantlement of site structures with temporary storage on-site (these structures include both those associated with this action and with the action documented in MacDonell and Peterson [1989, 1990]). Potential cumulative health effects associated with these four activities are addressed in Section 6.3.1; cumulative environmental effects are addressed in Section 6.3.2. Potential cumulative impacts associated with future response actions at the Weldon Spring site will be assessed in future environmental compliance documentation, such as the RI/FS-EIS currently in preparation.

6.3.1 Health Impacts

The air pathway is considered the only pathway for potential exposure of the general public during implementation of the proposed action. However, this action is not expected to result in significant airborne releases because the structures would be extensively decontaminated prior to dismantlement and extensive engineering controls would be used. If elevated levels of radioactive and chemical contaminants were detected at the site perimeter, more stringent engineering controls would be applied to ensure that off-site releases were negligible. Of the other major actions currently planned for the chemical plant area, only one is expected to result in airborne releases of radioactive and chemical contaminants that could potentially impact off-site areas. This action is operation of the TSA for the quarry bulk waste remedial action. Hence, potential cumulative health impacts associated with the proposed action in combination with the other three on-site actions are represented by those associated with the quarry bulk waste remedial action (DOE 1990).

Cumulative health impacts to workers were also assessed for the four planned actions. Only two of the four actions would result in measurable radiological and chemical exposures – i.e., activities associated with unloading wastes at the TSA (to support the quarry bulk waste remedial action) and those associated with the currently proposed action. The incremental lifetime radiological risk to workers associated with TSA activities is estimated to be 9.6×10^{-3}, which is based on a cumulative worker dose of 16 person-rem. The estimated radiological risk for the proposed action is 3.0×10^{-2}. The cumulative radiological risk is the sum of these two values, or 4.0×10^{-2}. The proposed action is not expected to result in significant chemical carcinogenic or noncarcinogenic risks to workers. Hence, the cumulative chemical risks are represented by those estimated for TSA activities (DOE 1990).

The potential for cumulative occupational accidents, with resultant fatalities and injuries, during implementation of the activities currently planned for the chemical plant area is the sum of those given in Table 10 for the proposed action and those given in DOE (1990) for TSA activities associated with the quarry bulk waste remedial action. Although no occupational fatalities would be expected, an estimated 51 cases of occupational injuries could occur. All activities associated with the proposed action would be conducted in accordance with health and safety plans for the site and with health-based regulatory requirements. The project's commitment to conducting all activities in a safe and protective manner is expected to minimize the likelihood of occupational accidents.

In summary, no significant cumulative health effects to the general public or to workers are expected to result from implementing the proposed action to decontaminate and dismantle contaminated site structures concurrently with other planned activities.

6.3.2 Environmental Impacts

Potential adverse environmental impacts associated with the proposed action are expected to be minor. The action is limited to the chemical plant area and would not impact off-site areas. Cumulative impacts are limited to those associated with decontaminating and dismantling the structures concurrently with other construction activities, e.g., at the TSA and MSA. Construction impacts would be of short duration, would influence only the immediate area of the activities, and would be mitigated by such measures as limiting the size of the work area and using silt fences and straw bales for erosion control. Surface water would be managed as a component of this action to minimize impacts to off-site surface water. Air quality impacts would be minimized by controlling emissions by means of engineering measures and by using monitoring systems and contingency plans to ensure environmental protection.

The area disturbed by the various construction activities planned for the site totals approximately 22 ha (55 acres). However, the affected areas have been disturbed by past activities, are actively mowed, do not provide unique wildlife habitat or contain species that are restricted in distribution, and constitute a very small area compared with the surrounding wildlife areas. Hence, no significant cumulative environmental impacts are expected. In addition, the actions would be temporary and any impacts would be limited to the short term. The long-term environmental impacts of the proposed action, in combination with other activities for remediating the site, are expected to be beneficial. Removal of contaminated structures and other sources of contamination would reduce the potential for future environmental exposures, and associated restoration activities would facilitate future beneficial use of the site for wildlife habitat.

In summary, no significant cumulative environmental impacts are expected to result from implementing the proposed action to decontaminate and dismantle contaminated structures at the chemical plant area concurrently with other planned activities.

7 AGENCIES CONTACTED

The following agencies have been consulted for planned activities at the chemical plant area of the Weldon Spring site:

- Missouri Department of Conservation, Jefferson City
- Missouri Department of Health, Jefferson City
- Missouri Department of Natural Resources, Jefferson City
- U.S. Army Corps of Engineers, Kansas City District, Kansas City, Missouri
- U.S. Fish and Wildlife Service, Columbia, Missouri
- U.S. Environmental Protection Agency, Region VII, Kansas City, Kansas

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APPENDIX A:

INVENTORY OF MATERIAL ASSOCIATED WITH THE CONTAMINATED STRUCTURES

APPENDIX A:

INVENTORY OF MATERIAL ASSOCIATED WITH THE CONTAMINATED STRUCTURES

An inventory of the contents of the contaminated structures is included in the Waste Inventory Tracking System (WITS) maintained at the Weldon Spring site. This data base, which is continually updated as the project proceeds, provides a systematic mechanism for tracking the contents of these structures. The contents of the structures that are the subject of this removal action are listed in the following table. This information was extracted from the WITS data base and reflects information as of January 1991. Not included in this table is information associated with ongoing response actions (e.g., waste associated with the chemical consolidation program and debris resulting from dismantlement of Buildings 401 and 409); management of this material has been described in previous documents. In addition, the table does not yet contain information associated with all structures involved in this action (i.e., 303, 426, 427, 434, and the on-site railroad system). Such information is currently being compiled for inclusion in the data base.

TABLE A.1 Waste Inventory for the Contaminated Structures

Category	Subcategory	Class	Subclass	Amount
Building 101				
Metal	Galvanized carbon steel	Conduit	-	2,000 ft
Metal	Carbon steel	Structural	-	578 tons
Metal	Carbon steel	Equipment	-	100 tons
ACM[a]	-	Structural	Siding	1,063 ft^3
ACM	-	Structural	Roofing	4,333 ft^3
ACM	-	Structural	Floor tile	5 ft^3
Concrete	-	Slab	-	40,900 ft^3
Glass	-	Windows	-	26 ft^3
Concrete	-	Masonry	Block walls	4,800 ft^2
ACM	-	Bulk	Pipe wrapping	200 ft^3
Metal	-	Piping	-	1,000 ft
Structures 102A,B				
Metal	Carbon steel	Structural	-	8 tons
Metal	Carbon steel	Tanks	-	20 tons
Building 103				
Metal	Galvanized carbon steel	Conduit	-	2,000 ft
Metal	Carbon steel	Equipment	HVAC[b]	68,268 lb
Metal	Carbon steel	Structural	-	875 tons
Metal	Carbon steel	Equipment	-	12 tons
ACM	-	Structural	Floor tile	29 ft^3
Wood	-	Structural	Movable partitions	3,500 ft^3
Metal	Aluminum	Side/roof	-	1,126 ft^3
Glass	-	Windows	-	81 ft^3
Concrete	-	Masonry	Block walls	7,000 ft^2
Metal	Carbon steel	Tanks	-	100 tons
ACM	-	Bulk	Pipe wrapping	67 ft^3
Metal	-	Piping	-	7,000 ft
Wood	-	Furniture	Tables/chairs	222 ft^3
Porcelain	-	Plumbing fixtures	Sinks	6 ft^3
Porcelain	-	Plumbing fixtures	Urinals	2 ft^3
Porcelain	-	Plumbing fixtures	Toilets	4 ft^3
Metal	-	Furniture	Lockers	30 ft^3
Metal	-	Furniture	Desks/chairs	52 ft^3

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 105				
Metal	Galvanized carbon steel	Conduit	-	2,000 ft
Metal	Carbon steel	Equipment	HVAC	38,075 lb
Metal	Carbon steel	Structural	-	601 tons
Metal	Carbon steel	Equipment	-	40 tons
Metal	Aluminum	Side/roof	-	797 ft^3
Glass	-	Windows	-	47 ft^3
Concrete	-	Masonry	Block walls	14,700 ft^2
Metal	Carbon steel	Tanks	-	145 tons
ACM	-	Bulk	Pipe wrapping	167 ft^3
Metal	-	Piping	-	1,000 ft
Building 106				
Metal	Galvanized carbon steel	Conduit	-	50 ft
Metal	Carbon steel	Structural	-	1 ton
Metal	Carbon steel	Equipment	-	1 ton
Metal	Aluminum	Side/roof	-	8 ft^3
Glass	-	Windows	-	1 ft^3
ACM	-	Bulk	Pipe wrapping	2 ft^3
Metal	-	Piping	-	20 ft
Building 108				
Metal	Galvanized carbon steel	Conduit	-	500 ft
Metal	Carbon steel	Structural	-	20 tons
Metal	Carbon steel	Equipment	-	2 tons
ACM	-	Structural	Roofing	833 ft^3
Concrete	-	Slab	-	1,250 ft^3
Concrete	-	Masonry	Block walls	3,000 ft^2
ACM	-	Bulk	Pipe wrapping	2,667 ft^3
Metal	-	Piping	-	10,000 ft
Buildings 109, 110				
Metal	Carbon steel	Structural	-	15 tons
Metal	Aluminum	Side/roof	-	125 ft^3

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 201				
Metal	Galvanized carbon steel	Conduit	-	81,000 ft
Metal	Carbon steel	Equipment	HVAC	50,000 lb
Metal	Carbon steel	Structural	-	1,287 tons
Metal	Carbon steel	Equipment	-	1,730 tons
ACM	-	Bulk	Equipment wrapping	35,000 ft^2
ACM	-	Structural	Siding	861 ft^3
ACM	-	Structural	Roofing	11,988 ft^3
Wood	-	Structural	Movable partitions	1,300 ft^3
Metal	Aluminum	Side/roof	-	49 ft^3
Concrete	-	Slab	-	31,080 ft^3
Glass	-	Windows	-	106 ft^3
Concrete	-	Masonry	Block walls	62,000 ft^2
ACM	-	Bulk	Pipe wrapping	3,667 ft^3
Metal	-	Piping	-	31,000 ft
Wood	-	Furniture	Desks/chairs	100 ft^3
Porcelain	-	Plumbing fixtures	Toilets	10 ft^3
Porcelain	-	Plumbing fixtures	Urinals	3 ft^3
Porcelain	-	Plumbing fixtures	Sinks	14 ft^3
Metal	-	Equipment	Miscellaneous	16 ft^3
Building 202				
Metal	Galvanized carbon steel	Conduit	-	5,500 ft
Metal	Carbon steel	Structural	-	88 tons
ACM	-	Structural	Siding	122 ft^3
ACM	-	Structural	Roofing	1,167 ft^3
Metal	Aluminum	Side/roof	-	20 ft^3
Concrete	-	Slab	-	1,750 ft^3
Metal	Carbon steel	Tanks	-	200 tons
ACM	-	Bulk	Pipe wrapping	1,333 ft^3
Metal	-	Piping	-	8,000 ft

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 301				
Metal	Galvanized carbon steel	Conduit	-	45,000 ft
Metal	Carbon steel	Equipment	HVAC	5,000 lb
Metal	Carbon steel	Structural	-	1,300 tons
Metal	Carbon steel	Equipment	-	3,400 tons
ACM	-	Bulk	Equipment wrapping	40,000 ft^2
ACM	-	Structural	Siding	3,028 ft^3
ACM	-	Structural	Roofing	19,481 ft^3
Concrete	-	Slab	-	29,250 ft^3
Glass	-	Windows	-	172 ft^3
Concrete	-	Masonry	Block walls	14,666 ft^2
ACM	-	Bulk	Pipe wrapping	1,667 ft^3
Metal	-	Piping	-	14,000 ft
Metal	-	Equipment	Miscellaneous	2,479 ft^3
Metal	-	Furniture	Filing cabinets	396 ft^3
Porcelain	-	Plumbing fixtures	Toilets	10 ft^3
Porcelain	-	Plumbing fixtures	Urinals	3 ft^3
Porcelain	-	Plumbing fixtures	Sinks	10 ft^3
Wood	-	Equipment	Pallets	168 ft^3
-	Insulation	-	Cocoon waste	1,200 ft^3
Building 403				
Metal	Galvanized carbon steel	Conduit	-	12,000 ft
Metal	Carbon steel	Equipment	HVAC	55,700 lb
Metal	Carbon steel	Structural	-	200 tons
Metal	Carbon steel	Equipment	-	890 tons
ACM	-	Bulk	Equipment wrapping	17,800 ft^2
ACM	-	Structural	Siding	138 ft^3
ACM	-	Structural	Roofing	5,933 ft^3
ACM	-	Structural	Floor tile	9 ft^3
Metal	Aluminum	Side/roof	-	416 ft^3
Concrete	-	Slab	-	9,500 ft^3
Glass	-	Windows	-	6 ft^3
Concrete	-	Masonry	Block walls	5,550 ft^2
ACM	-	Bulk	Pipe wrapping	607 ft^3
Metal	-	Piping	-	26,000 ft

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 404				
Metal	Galvanized carbon steel	Conduit	-	8,200 ft
Metal	Carbon steel	Equipment	HVAC	38,462 lb
Metal	Carbon steel	Structural	-	178 tons
Metal	Carbon steel	Equipment	-	620 tons
ACM	-	Bulk	Equipment wrapping	12,400 ft^2
ACM	-	Structural	Roofing	4,129 ft^3
ACM	-	Structural	Floor tile	10 ft^3
Metal	Aluminum	Side/roof	-	317 ft^3
Concrete	-	Slab	-	6,200 ft^3
Glass	-	Windows	-	5 ft^3
Concrete	-	Masonry	Block walls	6,500 ft^2
ACM	-	Bulk	Pipe wrapping	607 ft^3
Metal	-	Piping	-	26,000 ft
Structures 405A,B				
Metal	Galvanized carbon steel	Conduit	-	3,700 ft
Metal	Carbon steel	Equipment	HVAC	12,821 lb
Metal	Carbon steel	Structural	-	11 tons
Metal	Carbon steel	Equipment	-	95 tons
ACM	-	Bulk	Equipment wrapping	5,515 ft^2
ACM	-	Structural	Roofing	1,836 ft^3
Metal	Aluminum	Side/roof	-	48 ft^3
Concrete	-	Slab	-	2,758 ft^3
Glass	-	Windows	-	3 ft^3
ACM	-	Bulk	Pipe wrapping	2,000 ft^3
Metal	-	Piping	-	9,000 ft
Metal	-	Equipment	Debris	20 ft^3
Building 406				
Metal	Galvanized carbon steel	Conduit	-	7,000 ft
Metal	Carbon steel	Structural	-	27 tons
ACM	-	Structural	Roofing	5,328 ft^3
Concrete	-	Slab	-	8,000 ft^3
Glass	-	Windows	-	3 ft^3

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 406 (Cont'd)				
Concrete	-	Masonry	Block walls	13,200 ft^2
ACM	-	Bulk	Pipe wrapping	400 ft^3
Metal	-	Piping	-	4,800 ft
Porcelain	-	Plumbing fixtures	Toilets	4 ft^3
Porcelain	-	Plumbing fixtures	Urinals	1 ft^3
Porcelain	-	Plumbing fixtures	Sinks	4 ft^3
Building 407				
Metal	Galvanized carbon steel	Conduit	-	87,284 ft
Metal	Carbon steel	Equipment	HVAC	167,000 lb
Metal	Carbon steel	Structural steel	-	282 tons
Metal	Carbon steel	Equipment	-	55 tons
ACM	-	Bulk	Equipment wrapping	25,000 ft^2
ACM	-	Structural	Roofing	16,249 ft^3
ACM	-	Structural	Floor tile	290 ft^3
Wood	-	Structural	Movable partitions	3,627 ft^3
Concrete	-	Slab	-	24,698 ft^3
Glass	-	Windows	-	3 ft^3
Concrete	-	Masonry	Block walls	28,840 ft^2
ACM	-	Bulk	Pipe wrapping	1,000 ft^3
Metal	-	Piping	-	44,805 ft
Debris	-	Mattresses	-	48 ft^3
ACM	-	Equipment	Gloves, rope, tongs	6 ft^3
Porcelain	-	Plumbing fixtures	Toilets	20 ft^3
Porcelain	-	Plumbing fixtures	Urinals	2 ft^3
Porcelain	-	Plumbing fixtures	Sinks	24 ft^3
Porcelain	-	Equipment	Eye wash	5 ft^3
Porcelain	-	Equipment	Laboratory ware	18 ft^3
Ceramic	-	Bricks	-	.8 ft^3
Graphite	-	-	-	.88 ft^3
Paper	-	-	Books	43 ft^3
Debris	-	-	Rubber, plastic	316 ft^3
Metal	-	Furniture	Cabinets, shelves	369 ft^3
Metal	-	Equipment	Pieces	4,119 ft^3
Glass	-	Equipment	Laboratory glassware	663 ft^3

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 408				
Metal	Galvanized carbon steel	Conduit	-	20,000 ft
Metal	Carbon steel	Equipment	HVAC	13,000 lb
Metal	Carbon steel	Structural	-	410 tons
Metal	Carbon steel	Equipment	-	28 tons
ACM	-	Bulk	Equipment wrapping	20,000 ft^2
ACM	-	Structural	Siding	34 ft^3
ACM	-	Structural	Roofing	24,585 ft^3
ACM	-	Structural	Floor tile	15 ft^3
Wood	-	Structural	Movable partitions	703 ft^3
Metal	Carbon steel	Side/roof	-	33 ft^3
Concrete	-	Slab	-	36,915 ft^3
Glass	-	Windows	-	85 ft^3
Concrete	-	Masonry	Block walls	43,034 ft^2
ACM	-	Bulk	Pipe wrapping	373 ft^3
Metal	-	Piping	-	30,000 ft
Porcelain	-	Plumbing fixtures	Toilets	18 ft^3
Porcelain	-	Plumbing fixtures	Urinals	2 ft^3
Porcelain	-	Plumbing fixtures	Sinks	26 ft^3
Wood	-	Furniture	Desks/tables	40 ft^3
Wood	-	Equipment	Carts	1 ft^3
Metal	-	Equipment	Miscellaneous	200 ft^3
Metal	-	Equipment	-	4,216 ft^3
Metal	-	Equipment	Tractor	1 unit
Metal	-	Equipment	Forklift	1 unit
Metal	-	Equipment	Vehicle	1 unit
Metal	-	Equipment	Bulldozer	1 unit
Metal	-	Equipment	Crane	1 unit
Metal	-	Equipment	Vehicle	1 unit
Metal	-	Equipment	Bicycle	1 unit
Metal	-	Furniture	Filing cabinets	2 ft^3
Metal	-	Furniture	Desks/miscellaneous	168 ft^3

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 410				
Metal	Galvanized carbon steel	Conduit	-	90,000 ft
Metal	Carbon steel	Equipment	HVAC	210,000 lb
Metal	Carbon steel	Structural	-	220 tons
Metal	Carbon steel	Equipment	-	60 tons
ACM	-	Bulk	Equipment wrapping	35,000 ft^2
ACM	-	Structural	Siding	106 ft^3
ACM	-	Structural	Roofing	18,388 ft^3
ACM	-	Structural	Floor tile	211 ft^3
Wood	-	Structural	Movable partitions	519 ft^3
Concrete	-	Slab	-	27,610 ft^3
Glass	-	Windows	-	58 ft^3
Concrete	-	Masonry	Block walls	41,540 ft^2
Metal	Carbon steel	Tanks	-	10 tons
ACM	-	Bulk	Pipe wrapping	617 ft^3
Metal	-	Piping	-	60,000 ft
Metal	-	Furniture	Filing cabinets	99 ft^3
Metal	-	Furniture	Desks/chairs	1,215 ft^3
Metal	-	Furniture	Shelves	190 ft^3
Metal	-	Furniture	Lockers	555 ft^3
Fiberglass	-	Equipment	Trays	10 ft^3
Ceramic	-	Equipment	Dishes	2 ft^3
Glass	-	Equipment	Kitchen glass	7 ft^3
Wood	-	Furniture	-	48 ft^3
Porcelain	-	Plumbing fixtures	Toilets	34 ft^3
Porcelain	-	Plumbing fixtures	Urinals	13 ft^3
Porcelain	-	Plumbing fixtures	Sinks	58 ft^3
Building 414				
Metal	Galvanized carbon steel	Conduit	-	1,000 ft
Metal	Carbon steel	Equipment	HVAC	3,000 lb
Metal	Carbon steel	Structural	-	38 tons
Metal	Carbon steel	Equipment	-	5 tons
ACM	-	Structural	Roofing	1,692 ft^3
Metal	Carbon steel	Side/roof	-	35 ft^3
Concrete	-	Slab	-	2,540 ft^3
Glass	-	Windows	-	2 ft^3
ACM	-	Bulk	Pipe wrapping	133 ft^3
Metal	-	Piping	-	800 ft

TABLE A.1 (Cont'd)

Category	Subcategory	Class	Subclass	Amount
Building 429				
Metal	Carbon steel	Equipment	-	1 ton
Metal	Carbon steel	Side/roof	-	23 ft^3
Glass	-	Windows	-	1 ft^3
Metal	Carbon steel	Tanks	-	410 tons
ACM	-	Bulk	Pipe wrapping	33 ft^3
Metal	-	Piping	-	150 ft
Building 430				
Metal	Galvanized carbon steel	Conduit	-	200 ft
Metal	Carbon steel	Structural	-	3 tons
Glass	-	Windows	-	1 ft^3
Metal	-	Equipment	Ladders	2 ft^3
Wood	-	Equipment	Boards	5 ft^3
Building 431				
Metal	Galvanized carbon steel	Conduit	-	400 ft
Metal	Carbon steel	Structural	-	1 ton
Metal	Carbon steel	Equipment	-	1 ton
Metal	Aluminum	Side/roof	-	8 ft^3
Glass	-	Windows	-	1 ft^3
ACM	-	Bulk	Pipe wrapping	2 ft^3
Metal	-	Piping	-	20 ft
Building 432				
Metal	Galvanized carbon steel	Conduit	-	400 ft
Metal	Carbon steel	Structural	-	1 ton
Metal	Aluminum	Side/roof	-	21 ft^3
Glass	-	Windows	-	1 ft^3
ACM	-	Bulk	Pipe wrapping	2 ft^3
Metal	-	Piping	-	20 ft

[a]ACM = asbestos-containing material.

[b]HVAC = heating, ventilation, and air-conditioning.

APPENDIX B:

REGULATORY REQUIREMENTS POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE PROPOSED ACTION

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REGULATORY REQUIREMENTS POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE PROPOSED ACTION

Potential requirements for a proposed action can be grouped into two general categories: (1) applicable or relevant and appropriate requirements (ARARs) and (2) "to-be-considered" (TBC) requirements. The first category consists of promulgated standards (e.g., public laws codified at the state or federal level) that may be applicable or relevant and appropriate to all or part of the proposed action. The second category consists of standards or guidelines that have been published but not promulgated and that may have specific bearing on all or part of the action, e.g., DOE Orders.

In addressing a requirement that may affect the proposed action, a determination is made regarding its relationship to (1) the location of the action, (2) the contaminants involved, and (3) the specific components of the action, e.g., factors associated with a certain technology. Any regulation, standard, requirement, criterion, or limitation under any federal or state environmental law or state facility siting law may be either *applicable* or *relevant and appropriate* to a remedial action, but not both. Only those state laws may become ARARs that are (1) promulgated, such that they are legally enforceable and generally applicable (i.e., consistently applied) and (2) more stringent than federal laws.

Applicable requirements are those that specifically address the circumstance(s) at the site, whereas relevant and appropriate requirements are those that address circumstances sufficiently similar that they are well suited to the site. That is, a potential ARAR is applicable if its prerequisites or regulated conditions are specifically met by the conditions of the proposed action (e.g., site location in a floodplain); if the conditions of a requirement are not specifically applicable, then a determination must be made as to whether they are sufficiently similar to be considered both relevant *and* appropriate (e.g., in terms of contaminant similarities and the nature and setting of the proposed action). This similarity is determined on the basis of best professional judgment, considering factors that include (1) the purpose of the requirement; (2) the medium, substance, action, type of place, and type and size of facility regulated; and (3) the use or potential use of affected resources, relative to the nature of these factors at the site.

In accordance with EPA guidance on ARARs, only applicable requirements are evaluated for off-site actions whereas both applicable and relevant and appropriate requirements are evaluated for on-site actions. On-site actions must comply with a requirement that is determined to be relevant and appropriate to the same extent as one that is determined to be applicable. However, a determination of relevance and appropriateness may be applied to only portions of a requirement whereas a determination of applicability is applied to the requirement as a whole. On-site actions, such as the proposed removal action, must comply with substantive requirements of ARARs but not related administrative and procedural requirements. For example, response actions conducted on-site would not require a permit but would be conducted in accordance with the permitted conditions.

Potential TBC requirements, such as concentration limits proposed in interim EPA guidance memoranda, are typically considered only if no promulgated requirements exist that are either applicable or relevant and appropriate. Thus, TBC requirements are often considered secondary to ARARs. However, certain TBC requirements such as DOE Orders are developed on the basis of promulgated standards and can necessitate the same degree of compliance as ARARs. Because the Weldon Spring site is a DOE facility, response actions at the site are conducted in accordance with DOE Orders irrespective of the "TBC" designation of these Orders under the formal ARAR process.

Activities at the Weldon Spring site are also conducted in compliance with worker protection requirements, including those identified in the Occupational Safety and Health Act and in a number of specific DOE Orders. Because these requirements address employee protection rather than environmental protection, they are not subject to consideration for attainment or waiver under the ARAR evaluation process. Rather, they are requirements with which the response actions must comply. Certain of these requirements are listed in this appendix for informational purposes (i.e., to identify worker-protection requirements that will be met by the proposed action) rather than as an indication of a formal ARAR evaluation.

Potential location-specific, contaminant-specific, and action-specific ARARs and TBC requirements for the proposed action are identified and evaluated in Tables B.1, B.2, and B.3, respectively. The preliminary ARAR and TBC determinations for the listed requirements are also indicated in the tables. Because this appendix presents a comprehensive list of requirements with considerable overlap of regulated conditions, all determinations have been identified as "potentially" applicable, relevant and appropriate, or to be considered. These determinations will be finalized in consultation with the state of Missouri and EPA Region VII prior to implementing the proposed action. During finalization, the requirements identified as potentially applicable will be reviewed to confirm direct applicability; only one requirement will be finalized from among those that regulate the same conditions. For those identified as potentially relevant and appropriate and as TBC requirements, both the specific portion(s) of the requirements that have bearing on the proposed action and the manner in which compliance would be achieved will be finalized. After the finalization process, certain of the requirements will remain potentially an ARAR or a TBC requirement as the action proceeds, pending identification of the existence of their prerequisites or regulated conditions (e.g., the presence of cultural resources or threatened or endangered species in the affected area). Because the scope of the proposed action does not include waste disposal, potential ARARs associated with disposal of radioactive, chemically hazardous, or uncontaminated material are not included in Table B.3.

In accordance with CERCLA, as amended, and the NCP, an alternative that does not meet an ARAR may be selected if one of the following waiver conditions is met:

- The alternative is an interim measure and will become part of a total remedial action that will attain the requirement;

- Compliance with the requirement will result in greater risk to human health and the environment than other alternatives;

- Compliance with the requirement is technically impracticable from an engineering perspective;

- The alternative will attain a standard of performance that is equivalent to that required under the otherwise applicable ARAR through use of another method or approach;

- For state requirements, the state has not consistently applied the promulgated requirement (or demonstrated the intention to do so) in similar circumstances at other remedial actions within the state; or

- For Superfund-financed actions only, an alternative that attains the ARAR will not provide a balance between achieving protectiveness at the site and retaining sufficient funds for responses at other sites. (This condition is not relevant to the Weldon Spring site because Superfund money is not being used to finance the cleanup.)

The first waiver condition applies directly to the proposed removal action because management of the contaminated structures is only part of the overall remedial action for the project.

TABLE B.1 Potential Location-Specific Requirements

Potential ARAR	Location	Requirement	Preliminary Determination	Remarks
Antiquity Act; Historic Sites Act (16 USC 431-433; 16 USC 461-467; 40 CFR 6.301(a))	Land	Cultural resources, such as historic buildings and sites and natural landmarks, must be preserved on federal land to avoid adverse impacts.	Potentially applicable	No adverse impacts to such resources are expected to result from the proposed action; however, if these resources were affected, the requirement would be applicable.
National Historic Preservation Act, as amended (16 USC 470 et seq.; 40 CFR 6.301(b); 36 CFR 800)	Land	The effect of any federally assisted undertaking must be taken into account for any district, site, building, structure, or object included in or eligible for the *National Register of Historic Places*.	Potentially applicable	No adverse impacts to such properties are expected to result from the proposed action; however, if these resources were affected, the requirement would be applicable.
Archeological and Historic Preservation Act (16 USC 469; 40 CFR 6.301(c); PL 93-291; 88 Stat. 174)	Land	Prehistorical, historical, and archeological data that might be destroyed as a result of a federal, federally assisted, or federally licensed activity or program must be preserved.	Potentially applicable	No destruction of such data is expected to result from the proposed action. The site has been considerably disturbed by past human activities and is therefore not expected to contain any such data. However, if these data were affected, the requirement would be applicable.
Archeological Resources Protection Act (16 USC 470(a))	Land	A permit must be obtained if an action on public or Indian lands could impact archeological resources.	Potentially applicable	No impacts to archeological resources are expected to result from the proposed action. The site has been considerably disturbed by past human activities and is therefore not expected to contain any such resources. However, if these resources were affected, the requirement would be applicable.
Protection and Enhancement of the Cultural Environment (Executive Order 11593; 40 CFR 6.301)	Land	Historical, architectural, archeological, and cultural resources must be preserved, restored, and maintained, and must be evaluated for inclusion in the *National Register*.	Potentially applicable	No impacts to such resources are expected to result from the proposed action. The site has been considerably disturbed by past human activities and is therefore not expected to contain any such resources. However, if these resources were affected, the requirement would be applicable.

TABLE B.1 (Cont'd)

Potential ARAR	Location	Requirement	Preliminary Determination	Remarks
Endangered Species Act, as amended (16 USC 1531-1543; 50 CFR 17.402; 40 CFR 6.302(h))	Any	Federal agencies must ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify any critical habitat.	Potentially applicable	No critical habitat exists in the affected area, and no adverse impacts to threatened or endangered species are expected to result from the proposed action; however, if such species were affected, the requirement would be applicable.
Missouri Wildlife Code (1989) (RSMo. 252.240; 3 CSR 10-4.111), Endangered Species	Any	Endangered species, i.e., those designated by the Missouri Department of Conservation and the U.S. Department of the Interior as threatened or endangered (see 1978 Code, RSMo. 252.240) may not be pursued, taken, possessed, or killed.	Potentially applicable	No critical habitat exists in the affected area, and no adverse impacts to threatened or endangered species are expected to result from the proposed action. However, if such species were affected, the requirement would be applicable.
Missouri Wildlife Code (1978) (RSMo. 252.240), Endangered species importation, transportation or sale, when prohibited – how designated – penalty	Any	The Missouri Department of Conservation must file with the state a list of animal species designated as endangered (for subsequent consideration of related requirements).	Potentially applicable	No critical habitat exists in the affected area, and no adverse impacts to threatened or endangered species are expected to result from the proposed action. However, if such species were affected, the requirement would be applicable.
Missouri Wildlife Code (1989) (RSMo. 252.240; 3 CSR 10-4.110), General Prohibition; Applications	Any	Wildlife, including their homes and eggs, may not be taken or molested.	Potentially relevant and appropriate	No wildlife would be actively taken or molested as part of the proposed action. Mitigative measures would be taken to minimize potential environmental impacts; these would serve to minimize impacts to wildlife.
Missouri Wildlife Code (1989) (RSMo. 252.240; 3 CSR 10-4.115), Special Management Areas	Any	Wildlife may not be taken, pursued, or molested on any state or federal wildlife refuge or any wildlife management area, except under permitted conditions.	Potentially relevant and appropriate	No wildlife would be actively taken, pursued, or molested in any wildlife areas as part of the proposed action. Mitigative measures would be taken to minimize potential environmental impacts; these would serve to minimize impacts to wildlife.

TABLE B.1 (Cont'd)

Potential ARAR	Location	Requirement	Preliminary Determination	Remarks
Missouri Wildlife Code (1978) (RSMo. 252.040), Taking of Wildlife – Rules and Regulations	Any	Wildlife may not be taken or pursued, except under permitted conditions.	Potentially relevant and appropriate	No wildlife would be actively taken or pursued as part of the proposed action. Mitigative measures would be taken to minimize potential environmental impacts; these would serve to minimize impacts to wildlife.
Fish and Wildlife Coordination Act (14 USC 441-444; 40 CFR 4.302(a))	Any	Adequate protection of fish and wildlife resources is required when any federal department or agency proposes or authorizes any modification (e.g., diversion or channeling) of any stream or other water body or any modification of areas affecting any stream or other water body.	Not an ARAR	No modification of streams or stream areas is planned as part of the proposed action.
Missouri Wildlife Code (1978) (RSMo.252.210), Contamination of streams	Stream	It is unlawful to put any deleterious substances into waters of the state in quantities sufficient to injure fish, except under precautionary measures approved by the Commission.	Not an ARAR	No such discharge is planned as part of the proposed action.
Floodplain Management (Executive Order 11988; 40 CFR 6.302(b))	Floodplain	Federal agencies must avoid, to the maximum extent possible, any adverse impacts associated with direct and indirect development of a floodplain.	Not an ARAR	No floodplain is located in the area impacted by the proposed decontamination and dismantlement of site structures.
Governor's Executive Order 82-19	Floodplain	Potential effects of actions taken in a floodplain must be evaluated to avoid adverse impacts.	Not an ARAR	No floodplain is located in the area impacted by the proposed decontamination and dismantlement of site structures.
Protection of Wetlands (Executive Order 11990; 40 CFR 6.302(a))	Wetland	Federal agencies must avoid, to the extent possible, any adverse impacts associated with the destruction or loss of wetlands and the support of new construction in wetlands if a practicable alternative exists.	Not an ARAR	No wetland is located in the area impacted by the proposed decontamination and dismantlement of site structures.

TABLE B.2 Potential Contaminant-Specific Requirements

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Radiation Protection of the Public and the Environment (DOE Order 5400.5)	Radiation	Any	The basic dose limit for nonoccupationally exposed individuals is 100 mrem/yr, above background, committed effective dose equivalent. Also, all radiation exposures must be reduced to levels as low as reasonably achievable.	To be considered	Although not promulgated standards, these requirements are derived from such standards and constitute requirements for protection of the public with which the proposed action will comply.
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.040), Maximum Permissible Exposure Limits	Radiation	Any	For persons outside a controlled area, the maximum permissible whole-body dose due to sources in or migrating from the controlled area is limited to 2 mrem in any 1 hour, 0.1 rem in any 7 consecutive days, and 0.5 rem in any year. (Note: a controlled area is an area that requires control of access, occupancy, and working conditions for radiation protection purposes; 0.5 rem = 500 mrem.)	Potentially applicable	These requirements may be applicable to protection of the public during implementation of the proposed action.
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192)	Radiation	Any	Processing operations during and prior to the end of the closure period at a facility managing uranium by-product material should be conducted in a manner that provides reasonable assurance that the annual dose equivalent does not exceed 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive material to the general environment (excluding radon-222 and its decay products).	Potentially relevant and appropriate	These requirements are not applicable because the proposed action to decontaminate and dismantle site structures does not constitute a processing operation, nor does it include a planned discharge of radioactive material to the environment. However, these requirements may be considered relevant and appropriate to protection of the public during implementation of the proposed action.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Radiation Protection for Occupational Workers (DOE Order 5480.11)	Radiation	Any	The effective dose equivalent received by any member of the public entering a controlled area is limited to 100 mrem/yr. Limiting values for the assessed dose from exposure of workers to radiation are as follows. (These values represent maximum limits; it is DOE policy to maintain radiation exposures as far below these limits as is reasonably achievable.)	To be considered	Although not promulgated standards, these constitute requirements for protection from radionuclide emissions in a controlled area with which the proposed action will comply.

Radiation Effect	Annual Dose Equivalent (rem)
Stochastic effects	5[a]
Nonstochastic effects	
Lens of eye	15
Organ, extremity, or tissue including skin of whole body	50
Unborn child, entire gestation period	0.5

[a]Annual effective dose equivalent.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Occupational Safety and Health Administration Standards; Occupational Health and Environmental Control (29 CFR 1910; 1910.96), Subpart G, Ionizing Radiation	Radiation	Any	The dose per calendar quarter resulting from exposure to radiation in a restricted area from sources in that area is limited to the following. Part of Body — Dose (rem) Whole body, head and trunk, active blood-forming organs, lens of eye, or gonads — 1¼ Hands and forearms, feet and ankles — 18¾ Skin of whole body — 7½ The occupational exposure of an individual younger than 18 is restricted to 10% of these limits; the whole-body dose to a worker may not exceed 3 rem in a calendar quarter and, when added to the cumulative occupational dose, may not exceed 5(N-18) rem, where N is the age of the exposed individual.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply. Therefore, these requirements are not subject to evaluation for attainment or waiver as part of the ARAR process. They are listed in this table to identify requirements for worker protection with which the proposed action will comply.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.040), Maximum Permissible Exposure Limits	Radiation	Any	Limits for occupational doses from ionizing radiation in a controlled area are as follows. Part of Body — Maximum Dose in Any Calendar Year (rem) — Maximum Dose in Any Calendar Quarter (rem) Whole body, head and trunk, major portion of bone marrow, gonads, or lens of eye — 5 — 3 Hands and forearms, feet and ankles — 75 — 25 Skin of large body area — 30 — 10 Also, the whole-body dose added to the cumulative occupational dose must not exceed 5(N-18) rem, where N is the age of the exposed individual.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.050), Personnel Monitoring and Radiation Surveys	Radiation	Any	Personnel monitoring and radiation surveys are required for each worker for whom there is any reasonable possibility of receiving a weekly dose from all radiation exceeding 50 mrem, taking into consideration the use of protective gloves and radiation-limiting devices. An exemption from routine monitoring may be granted under certain conditions.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
National Emission Standards for Hazardous Air Pollutants (40 CFR 61), Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities	Radionuclides other than radon-220 and radon-222	Air	Emissions of such radionuclides to the ambient air from DOE facilities should not result in an effective dose equivalent of >10 mrem/yr to any member of the public.	Potentially applicable	These requirements may be applicable to protection of the public during implementation of the proposed action because the Weldon Spring site is a DOE facility.
National Emission Standards for Hazardous Air Pollutants (40 CFR 61), Subpart T, National Emission Standards for Radon Emissions from the Disposal of Uranium Mill Tailings	Radon	Air	Radon-222 emissions to ambient air from uranium mill tailings piles that are no longer operational should not exceed 20 pCi/m^2-s.	Potentially relevant and appropriate	The Weldon Spring site is not a mill tailings site, so this requirement is not applicable; however, it may be considered relevant and appropriate for the management of material generated by the proposed action if this material is sufficiently similar to uranium mill tailings.
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192)	External gamma radiation	Air	The level of external gamma radiation in any occupied or habitable building must not exceed the background level by more than 20 μR/h.	Not an ARAR	The Weldon Spring site is not a mill tailings site, so these requirements are not applicable; neither are they relevant and appropriate because no such buildings are involved in the proposed action (i.e., the proposed action is to decontaminate and dismantle deteriorating chemical plant buildings, not to ready the buildings for habitation).
	Radon	Air	Releases of radon from tailings disposal piles must not exceed an average rate of 20 pCi/m^2-s or increase the annual average concentration in air outside the disposal site by more than 0.5 pCi/L.	Potentially relevant and appropriate	The Weldon Spring site is not a mill tailings site, and disposal is beyond the scope of the proposed action; therefore, these requirements are not applicable. However, they may be considered relevant and appropriate for the management of material generated by the proposed action if this material is sufficiently similar to uranium mill tailings.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192) (Cont'd)	Radon decay products	Air	The annual average (or equivalent) radon decay product concentration, including background, in any habitable building should not exceed 0.02 working level (WL) and in any case should not exceed 0.03 WL – where a WL is any combination of short-lived radon decay products in 1 liter of air, without regard to the degree of equilibrium, that will result in the emission of 1.3×10^5 MeV of alpha energy. (Note that 1 WL = 100 pCi/L for radon-222 in equilibrium with its decay products.)	Not an ARAR	The Weldon Spring site is not a mill tailings site, so these requirements are not applicable; neither are they relevant and appropriate because no such buildings are involved in the proposed action.
Radiation Protection of the Public and the Environment (DOE Order 5400.5)	Uranium, thorium, and radium	Air	Residual concentrations of radionuclides in air in uncontrolled areas are limited to the following. (For known mixtures of radionuclides, the sum of the ratios of the observed concentration of each radionuclide to its corresponding limit should not exceed 1.0.)	To be considered	Although not promulgated standards, these constitute requirements for protection of the public with which the proposed action will comply.

Isotope	Derived Concentration Guides[a] (μCi/mL) D	W	Y
Uranium-238	5×10^{-12}	2×10^{-12}	1×10^{-14}
Uranium-235	5×10^{-12}	2×10^{-12}	1×10^{-13}
Uranium-234	4×10^{-12}	2×10^{-12}	9×10^{-14}
Thorium-232	-[b]	7×10^{-15}	1×10^{-14}
Thorium-230	-	4×10^{-14}	5×10^{-14}
Radium-228	-	3×10^{-12}	-
Radium-226	-	1×10^{-12}	-

[a]D, W, and Y represent lung retention classes; removal half-times assigned to the compounds in classes D, W, and Y are 0.5, 50, and 500 days, respectively. Exposure conditions assume an inhalation rate of 8,400 m^3 of air per year (based on an exposure over 24 hours per day, 365 days per year).

[b]A hyphen means no limit has been established.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Radiation Protection of the Public and the Environment (DOE Order 5400.5) (Cont'd)	Radon	Air	The above-background concentration of radon-222 in air above an interim storage facility should not exceed 100 pCi/L at any point, an annual average of 30 pCi/L over the facility, or an annual average of 3 pCi/L at or above any location outside the site. The derived concentration guide for immersion in air in an uncontrolled area for both radon-220 and radon-222 is 3 pCi/L. (See also the discussion for DOE Order 5820.2A in Table B.3.)	To be considered	Although not promulgated standards, these constitute requirements for protection of the public with which the proposed action will comply.
	Radon	Air	Releases of radon-222 from residual radioactive material disposal sites should not exceed an annual average release rate of 20 pCi/m^2-s or increase the annual average radon-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L.	To be considered	Although these are not promulgated standards and disposal is beyond the scope of the proposed action, they constitute requirements for protection of the public from releases from stored material with which the proposed action will comply.
	Radon decay products	Air	The annual average (or equivalent) radon decay product concentration, including background, in any habitable building should not exceed 0.02 WL and in any case should not exceed 0.03 WL.	To be considered	These requirements are not promulgated and are therefore listed as "to be considered;" however, they are not generally pertinent to the proposed action because no such buildings are involved.
	External gamma radiation	Air	The level of external gamma radiation in any occupied or habitable building should not exceed the background level by more than 20 μR/h.	To be considered	This requirement is not promulgated and is therefore listed as "to be considered;" however, it is not generally pertinent to the proposed action because no such buildings are involved.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.040), Maximum Permissible Exposure Limits	Uranium, thorium, radium, and radon	Air	The concentrations of radionuclides in air outside a controlled area (above natural background), averaged over any calendar quarter, should not exceed the following limits.	Potentially applicable	These requirements may be applicable to protection of the public during implementation of the proposed action.

Isotope	Solubility Class	Concentration (μCi/mL)
U-natural	Soluble	3×10^{-12}
	Insoluble	2×10^{-12}
Uranium-238	Soluble	3×10^{-12}
	Insoluble	5×10^{-12}
Uranium-235	Soluble	2×10^{-11}
	Insoluble	4×10^{-12}
Uranium-234	Soluble	2×10^{-11}
	Insoluble	4×10^{-12}
Thorium-232	Soluble	7×10^{-14}
	Insoluble	4×10^{-13}
Thorium-230	Soluble	6×10^{-14}
	Insoluble	3×10^{-13}
Radium-228	Soluble	2×10^{-12}
	Insoluble	1×10^{-12}
Radium-226	Soluble	1×10^{-12}
	Insoluble	6×10^{-8}
Radon-222	-	1×10^{-8}
Radon-220	-	1×10^{-8}

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Occupational Safety and Health Administration Standards; Occupational Health and Environmental Control (29 CFR 1910; 1910.96), Subpart G, Ionizing Radiation	Uranium, thorium, radium, and radon	Air	Occupational exposure to airborne radioactive material should not exceed the following concentrations, averaged over a 40-hour work week of seven consecutive days. (For hours of exposure less than or greater than 40, the limits are proportionately increased or decreased, respectively.)	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.

Isotope	Solubility Class	Concentration (μCi/mL)
U-natural	Soluble	1×10^{-10}
	Insoluble	1×10^{-10}
Uranium-238	Soluble	7×10^{-11}
	Insoluble	1×10^{-10}
Uranium-235	Soluble	5×10^{-10}
	Insoluble	1×10^{-10}
Uranium-234	Soluble	6×10^{-10}
	Insoluble	1×10^{-10}
Thorium-232	Soluble	3×10^{-11}
	Insoluble	3×10^{-11}
Thorium-230	Soluble	2×10^{-12}
	Insoluble	1×10^{-11}
Radium-228	Soluble	7×10^{-11}
	Insoluble	4×10^{-11}
Radium-226	Soluble	3×10^{-11}
	Insoluble	5×10^{-11}
Radon-222[a]	-	3×10^{-8}
Radon-220	-	3×10^{-7}

[a]Limit is appropriate for radon-222 combined with its short-lived decay products and may be replaced by 1/3 WL; the limit in restricted areas may be based on an annual average.

For mixtures of radionuclides, the sum of the ratios of the quantity present to the specific limit should not exceed 1. For uranium, chemical toxicity may be the limiting factor for soluble mixtures of uranium-238, uranium-235, and uranium-234 in air; if the percent by weight of uranium-235 is less than 5, the concentration limit for uranium is 0.007 mg/m^3 inhaled air.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Radiation Protection for Occupational Workers (DOE Order 5480.11)	Uranium, thorium, radium, and radon	Air	Occupational exposure to airborne radioactive material should not exceed the following concentrations on an annual average. (Values for radon isotopes assume 100% equilibrium with the short-lived decay products; these values may be replaced by 1 WL for radon-220 and 1/3 WL for radon-222.)	To be considered	Although these are not promulgated requirements, they constitute requirements for worker protection with which the proposed action will comply.

Isotope	Derived Air Concentrations[a] (μCi/mL) D	W	Y
Uranium-238	6×10^{-10}	3×10^{-10}	2×10^{-11}
Uranium-235	6×10^{-10}	3×10^{-10}	2×10^{-11}
Uranium-234	5×10^{-10}	3×10^{-10}	2×10^{-11}
Thorium-232	-[b]	5×10^{-13}	1×10^{-12}
Thorium-230	-	3×10^{-12}	7×10^{-12}
Radium-228	-	5×10^{-10}	-
Radium-226	-	3×10^{-10}	-
Radon-222	3×10^{-8}	-	-
Radon-220	8×10^{-9}	-	-

[a]D, W, and Y represent lung retention classes; removal half-times assigned to the compounds in classes D, W, and Y are 0.5, 50, and 500 days, respectively. Exposure conditions assume an inhalation rate of 2,400 m^3 of air per year (based on an exposure over 40 hours per week, 50 weeks per year).

[b]A hyphen means no limit has been established.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.040), Maximum Permissible Exposure Limits	Uranium, thorium, radium, and radon	Air	Occupational exposure to airborne radioactive material, averaged over any calendar quarter, should not exceed the following limits. (Limits apply to occupational exposure in a controlled area and are based on a work week of 40 hours; for longer work weeks, the values must be adjusted downward.)	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.

Isotope	Solubility Class	Concentration (µCi/mL)
U-natural	Soluble	7×10^{-11}
	Insoluble	6×10^{-11}
Uranium-238	Soluble	7×10^{-11}
	Insoluble	1×10^{-10}
Uranium-235	Soluble	5×10^{-10}
	Insoluble	1×10^{-10}
Uranium-234	Soluble	6×10^{-10}
	Insoluble	1×10^{-10}
Thorium-232	Soluble	2×10^{-12}
	Insoluble	1×10^{-11}
Thorium-230	Soluble	2×10^{-12}
	Insoluble	1×10^{-11}
Radium-228	Soluble	7×10^{-11}
	Insoluble	4×10^{-11}
Radium-226	Soluble	3×10^{-11}
	Insoluble	2×10^{-7}
Radon-222	-	3×10^{-8}
Radon-220	-	3×10^{-7}

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Occupational Safety and Health Administration Standards (29 CFR 1910; 1910.1000), Subpart Z, Toxic and Hazardous Substances	Specific organic and inorganic substances	Air	Permissible occupational exposure limits for various airborne substances have recently been revised to the following final rule limits; they may be achieved by any reasonable combination of engineering controls, work practices, and personal protective equipment.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.

Parameter	Limit[a] (mg/m^3)	Condition
Aluminum	15	For total dust, as aluminum metal; limit for respirable dust and for welding fumes (determined from breathing-zone air samples) is 5 mg/m^3; limit for soluble salts is 2 mg/m^3.
Cadmium	0.2	Dust, as cadmium; limit for fume, as cadmium, is 0.1 mg/m^3; respective ceilings (limits not to be exceeded during any part of a work day) are 0.6 and 0.3 mg/m^3, as cadmium.
Carbon monoxide	40	The ceiling is 229 mg/m^3. (Measured in ppm, the limit is 35 and the ceiling is 200.)
Chlorobiphenyl (PCB, 54% chlorine)	0.5	Skin absorption to be reduced (e.g., with protective clothing) to limit overall exposure via the cutaneous route (airborne or direct contact).
Chromium	1	As chromium metal; limit for chromium II and III compounds, as chromium, is 0.5 mg/m^3.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement			Preliminary Determination	Remarks
			Parameter	Limit[a] (mg/m^3)	Condition		
(Cont'd)			Copper	1	For dusts and mists, as copper; limit for fume, as copper, is 0.1 mg/m^3.		
			Fluorides	2.5	As flourine.		
			Iron	10	For iron oxide fume, as the short-term (15-minute) limit (in ppm).		
			Lead	0.05	For metallic lead and inorganic compounds, as lead.		
			Manganese	1	For fume, as manganese; the limit for short-term (15-minute) exposure is 3 mg/m^3, and the ceiling for manganese compounds, as manganese, is 5 mg/m^3.		
			Nickel	0.1	For soluble compounds, as nickel; limit for metallic nickel and insoluble compounds, as nickel, is 1 mg/m^3.		
			Particulates:		For particulates not otherwise regulated (i.e., nuisance dust).		
			Total dust	15			
			Respirable fraction	5			
			Silver	0.01	For metal and soluble compounds, as silver.		

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
(Cont'd)					

Parameter	Limit[a] (mg/m^3)	Condition
Uranium	0.05	For soluble compounds, as uranium; limit for insoluble compounds, as uranium, is 0.2 mg/m^3, with a short-term (15-minute) exposure limit of 0.6 mg/m^3.
Welding fumes	5	As total particulates, determined from breathing-zone air samples.
Zinc	10	For zinc oxide dust (total); limit for respirable dust is 5 mg/m^3; limit for zinc oxide fume is 5 mg/m^3, and the short-term (15-minute) exposure limit is 10 mg/m^3.

[a]Permissible exposure limit expressed as the 8-hour time-weighted average, except as noted.

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Clean Air Act, as amended (42 USC 7401-7642); National Primary and Secondary Ambient Air Quality Standards (40 CFR 50)	Particulate matter, lead	Air	For a major stationary source (see 40 CFR 52.2(b)(1)(i)(a)) that emits >250 tons/year of any regulated pollutant or >100 tons/year of a regulated pollutant for which the area is designated as nonattainment, particulate matter less than 10 μm in diameter (PM-10) should not exceed a 24-hour average concentration of 150 $\mu g/m^3$ or an annual arithmetic mean of 50 $\mu g/m^3$. The standard for lead and its compounds, as elemental lead, is 1.5 $\mu g/m^3$ as the maximum arithmetic mean averaged over the calendar quarter.	Not an ARAR	These requirements do not apply directly to source-specific emissions; rather, they are national limitations on ambient concentrations. However, they will be addressed in controlling emissions of particulates and lead that could result from implementation of the proposed action.
Missouri Air Conservation Law; Public Health and Welfare (RSMo. Title 12, 643.055), Commission may adopt rules for compliance with federal law – suspension, reinstatement	Any regulated under federal Clean Air Act	Air	Standards and guidelines promulgated to ensure that Missouri is in compliance with the Clean Air Act are not to be any stricter than those required under that act (see related discussion of 40 CFR 50).	Not an ARAR	These requirements do not apply directly to source-specific emissions; rather they are national limitations on ambient concentrations. However, they will be addressed in controlling emissions that could result from implementation of the proposed action.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Missouri Air Quality Standards; Air Quality Standards, Definitions, Sampling and Reference Methods, and Air Pollution Control Regulations for the State of Missouri (10 CSR 10-6.010), Ambient Air Quality	Particulate matter (PM-10), lead	Air	Concentrations of PM-10 are limited to an annual arithmetic mean of 50 $\mu g/m^3$ and a 24-hour average of 150 $\mu g/m^3$. The standard for lead is 1.5 $\mu g/m^3$ as the arithmetic mean averaged over one calendar quarter. (These state regulations address the St. Louis metropolitan area, which includes the geographic areas of St. Charles County.)	Not an ARAR	These requirements do not apply directly to source-specific emissions; rather, they are national limitations on ambient concentrations. However, they will be addressed in controlling emissions of particulates and lead that could result from implementation of the proposed action.
Missouri Air Pollution Control Regulations; Air Quality Standards and Air Pollution Control Regulations for the St. Louis Metropolitan Area (10 CSR 10-5.050), Restriction of Emission of Particulate Matter from Industrial Processes	Particulate matter	Air	Particulate matter from any industrial source may not exceed a concentration of 0.30 $grain/ft^3$ of exhaust gas; certain activities are exempted (e.g., grinding, crushing, and classifying operations at a rock quarry).	Not an ARAR	These requirements are neither applicable nor relevant and appropriate because no industrial processes are involved in the proposed action. However, they will be addressed in controlling particulate emissions that could be generated during implementation.
Missouri Air Pollution Control Regulations; Air Quality Standards and Air Pollution Control Regulations for the St. Louis Metropolitan Area (10 CSR 10-5.090), Restriction of Emission of Visible Air Contaminants	Particulate matter	Air	Emissions of particulate matter (<25 lb/h) from any single source, not including uncombined water, may not be darker than the shade of density designated as No. 2 on the Ringelmann Chart, or 40% opacity.	Not an ARAR	These requirements are neither applicable nor relevant and appropriate because the site does not constitute an emission source, per the regulatory definition. However, they will be addressed in controlling particulate emissions that could result from implementation of the proposed action.
Missouri Air Pollution Control Regulations; Air Quality Standards and Air Pollution Control Regulations for the St. Louis Metropolitan Area (10 CSR 10-5.100), Preventing Particulate Matter from Becoming Airborne	Particulate matter	Air	No person may permit the handling, transport, or storage of any material in a way that allows unnecessary amounts of fugitive particulate matter to become airborne and that results in at least one complaint being filed. To prevent particulate matter from becoming airborne during construction, use, repair, or demolition of a road, driveway, or open area, the following measures may be required: paving or frequent cleaning of roads, applying dust-free surfaces or water, and planting and maintaining a vegetative ground cover. (Unpaved public roads in unincorporated areas that are in compliance with particulate matter standards are excluded.)	Potentially relevant and appropriate	Although not directly applicable because vehicle routes are targeted by this regulation and the exclusion is pertinent, these requirements may be relevant and appropriate to the control of particulate emissions that could result from implementation of the proposed action.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Missouri Air Pollution Control Regulations; Air Quality Standards and Air Pollution Control Regulations for the St. Louis Metropolitan Area (10 CSR 10-5.180), Emission of Visible Air Contaminants from Internal Combustion Engines	Particulate matter	Air	Visible air contaminants (other than uncombined water) may not be released from an internal combustion engine for more than 10 seconds at any one time.	Potentially applicable	These requirements may be applicable to particulates released from any internal combustion engines used during the proposed action.
National Emission Standards for Hazardous Air Pollutants (40 CFR 61), Subpart M, National Emission Standard for Asbestos	Asbestos	Air	Warning signs must be posted; and discharge of visible emissions must not occur during the collection, processing, packaging, transporting, or deposition of friable asbestos-containing material.	Potentially applicable	This requirement may be applicable to protection of the public during the proposed action.
Toxic Substances Control Act, as amended (15 USC 2607-2629; PL 94-469 et seq.); Asbestos (40 CFR 763), Subpart G, Asbestos Abatement Projects	Asbestos	Air	Programs for worker protection (via clothing and equipment) must be implemented, and the permissible exposure limit for asbestos is 0.2 fiber/cm^3 of air as an 8-hour time-weighted average.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.
Occupational Safety and Health Administration Standards; Occupational Health and Environmental Control (29 CFR 1910; 1910.1001), Subpart G, Asbestos, Tremolite, Anthophyllite, and Actinolite	Asbestos	Air	Various asbestos-management activities are required for worker protection, including monitoring, timely response to releases, and the use of high-efficiency-particulate-air (HEPA)-filtered equipment for vacuuming. The permissible occupational exposure limit for asbestos as an 8-hour time-weighted average is 0.2 fiber/cm^3 of air.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.
Occupational Safety and Health Administration Construction Industry Standards (29 CFR 1926)	Asbestos	Air	Worker health and safety standards include a limit for occupational exposure to asbestos of 0.2 fiber/cm^3 of air as an 8-hour time-weighted average, with an action level of 0.1 fiber/cm^3 and a short-term (30-minute) limit of 1 fiber/cm^3 of air (fibers >5 μm).	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.

TABLE B.2 (Cont'd)

Potential ARAR	Contaminant	Medium	Requirement	Preliminary Determination	Remarks
Toxic Substances Control Act, as amended (15 USC 2607-2629; PL 94-469 et seq.); Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761), Subpart A, General	PCBs	Air	The release of inadvertently generated PCBs at the vent point for emissions must be <10 ppm.	Potentially relevant and appropriate	This requirement is not applicable because no PCBs would be generated and vented from manufacturing/processing activities as part of the proposed action; however, portions of this requirement may be relevant and appropriate because PCB emissions could potentially occur during implementation (e.g., during decontamination activities).
Occupational Safety and Health Administration Standards; Occupational Health and Environmental Control (29 CFR 1910; 1910.95), Subpart G, Occupational Noise Exposure	Noise	Air	The permissible occupational exposure level for noise is 90 dBA (slow response) for an 8-hour day; with decreasing times of exposure, the levels increase to 115 dBA per 15-minute day.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.
Toxic Substances Control Act, as amended (15 USC 2607-2629; PL 94-469 et seq.); Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761), Subpart C, PCB Spill Cleanup Policy	PCBs	Solid surfaces	Low-concentration spills on hard surfaces that involve less than 1 lb PCBs by weight (less than 270 gal of untested mineral oil) should be cleaned to remove visible traces. Impervious and nonimpervious solid surfaces at outdoor electrical substations contaminated by PCB spills should be cleaned to a PCB concentration of 100 µg/100 cm² as measured by standard wipe tests. In other restricted access areas, PCB spills on high-contact solid surfaces and on low-contact, indoor impervious and nonimpervious solid surfaces should be decontaminated to 10 µg/100 cm² (alternatively, low-contact, indoor nonimpervious surfaces could be cleaned to 10 times this level and encapsulated). Low-contact, outdoor impervious and nonimpervious surfaces should be cleaned to 100 µg/100 cm². In areas of unrestricted access, indoor solid surfaces and high-contact outdoor residential/commercial solid surfaces should be cleaned to 10 µg/100 cm², as should indoor vault areas and low-contact, outdoor impervious and nonimpervious solid surfaces (with an encapsulation option of 10 times this level for the nonimpervious surfaces).	Not an ARAR	These requirements are not applicable because any such spills at the site would have preceded its effective date. Neither are they relevant and appropriate because it is not the intent of the proposed action to clean surfaces (such as floor slabs) in areas that will be used in the future. Rather, the intent of the proposed action is to decontaminate the buildings to support their dismantlement. However, these requirements will be considered to address worker safety during implementation.

TABLE B.3 Potential Action-Specific Requirements

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Noise Control Act, as Amended; Noise Pollution and Abatement Act	Dismantlement activities	The public must be protected from noises that jeopardize human health or welfare.	Potentially applicable	Because equipment and vehicles would be involved in certain aspects of the proposed action, all pertinent requirements of the act would be followed.
Occupational Safety and Health Administration Standards for Hazardous Waste Operations and Emergency Response (29 CFR 1910)	Decontamination and waste handling	General worker protection requirements are established, as are requirements for worker training and the development of an emergency response plan and a safety and health program for employees. In addition, procedures are established for hazardous waste operations -- including decontamination and drum/container handling (e.g., for radioactive waste, asbestos, and PCBs).	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.
U.S. Nuclear Regulatory Commission Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material	Decontamination	Structural debris associated with licensed by-product, source, or special nuclear material that is released for reuse without radiological restrictions should be decontaminated to specified levels. The allowable total residual surface contamination levels for transuranics, iodine-125, iodine-129, radium-226, actinium-227, radium-228, thorium-228, thorium-230, and protactinium-231 are as follows: average, 100 dpm/100 cm^2; maximum, 300 dpm/100 cm^2; and removable, 20 dpm/100 cm^2.	Potentially applicable	These requirements are not applicable because the Weldon Spring site is not a nuclear facility licensed by the U.S. Nuclear Regulatory Commission. Furthermore, most of the requirements listed in the guidelines have been incorporated into DOE Order 5400.5, with which the proposed action will comply (see later entry in this table); however, this Order does not include the requirements shown here. These requirements may be relevant and appropriate to the release of structural material for reuse without radiological restrictions.

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Termination of Operating Licenses for Nuclear Reactors (U.S. Nuclear Regulatory Commission Regulatory Guide 1.86)	Decontamination	Structural debris associated with licensed reactors that is released for reuse without radiological restrictions should be decontaminated to specified levels.	Potentially relevant and appropriate	These requirements are not applicable because the Weldon Spring site is not a nuclear reactor licensed by the U.S. Nuclear Regulatory Commission. Furthermore, most of the requirements listed in this regulatory guide have been incorporated into DOE Order 5400.5, with which the proposed action will comply. The allowable surface contamination levels included in this regulatory guide are identical to those discussed in the previous entry in this table.
Radiation Protection of the Public and the Environment (DOE Order 5400.5)	Decontamination	Structural debris that is released from DOE facilities for reuse without radiological restrictions should be decontaminated to the following levels.	To be considered	Although not promulgated standards, these constitute requirements for protection of the public with which the proposed action will comply.

Radionuclides[b]	Allowable Total Residual Surface Contamination ($dpm/100\ cm^2$)[a] Average[c,d]	Maximum[e]	Removable[d,f]
Transuranics, iodine-125, iodine-129, radium-226, actinium-227, radium-228, thorium-228, thorium-230, protactinium-231	Reserved	Reserved	Reserved

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
(Cont'd)				

Radionuclides[b]	Allowable Total Residual Surface Contamination (dpm/100 cm^2)[a] Average[c,d]	Maximum[e]	Removable[d,f]
Thorium-natural, strontium-90, iodine-126, iodine-131, iodine-133, radium-223, radium-224, uranium-232, thorium-232	1,000	3,000	200
Uranium-natural, uranium-235, uranium-238, and associated decay products, alpha emitters	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except strontium-90 and others noted above[g]	5,000	15,000	1,000

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
(Cont'd)		[a] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation. [b] Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently. [c] Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of smaller surface area, the average should be derived for each such object. [d] The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm. [e] The maximum contamination level applies to an area of not more than 100 cm^2. [f] The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper (applying moderate pressure) and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination. [g] This category of radionuclides includes mixed fission products, including strontium-90, that have been separated from other fission products or mixtures where the strontium-90 has been enriched.		

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Radioactive Waste Management (DOE Order 5820.2A)	Radioactive waste management	External exposure to radioactive waste (including releases) should not result in an effective dose equivalent of >25 mrem/yr to any member of the public, and releases to the atmosphere should meet the requirements of 40 CFR 61 (see related discussion for contaminant-specific requirements). An environmental monitoring program must be implemented to address compliance with performance standards.	To be considered	Although not promulgated standards, these constitute requirements for controlling exposures and releases and for environmental monitoring with which the proposed action will comply. The current monitoring program for the site is being expanded for the action period of site cleanup.
Radiation Protection of the Public and the Environment (DOE Order 5400.5)	Interim radioactive waste storage and management	The control and stabilization features of a storage facility for waste containing uranium, thorium, and their decay products should be designed to ensure an effective life of 50 years, with a minimum life of at least 25 years, to the extent reasonably achievable; site access controls should be designed to ensure an effective life of at least 25 years, to the extent reasonable; and periodic monitoring, shielding, access restrictions, and safety measures must be implemented to control the migration of radioactive material, as appropriate.	To be considered	Although not promulgated standards, these constitute requirements for storage and management of material resulting from the proposed decontamination and dismantlement of site structures with which the proposed action will comply.
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.070), Storage of Radioactive Materials	Radioactive waste storage	Radioactive materials must be stored in a manner that will not result in the exposure of any person, during routine access to a controlled area, in excess of the limits identified in 19 CSR 20-10.040 (see related discussion for contaminant-specific requirements); a facility used to store materials that may emit radioactive gases or airborne particulate matter must be vented to ensure that the concentration of such substances in the air does not constitute a radiation hazard; and provisions must be made to minimize the hazard to emergency workers in the event of a fire, earthquake, flood, or windstorm.	Potentially applicable	These requirements may be applicable to the storage of certain material resulting from the proposed action.

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Missouri Radiation Regulations; Protection Against Ionizing Radiation (19 CSR 20-10.080), Control of Radioactive Contamination	Radioactive waste management	All work must be carried out under conditions that minimize the potential spread of radioactive material that could result in the exposure of any person above any limit specified in 19 CSR 20-10.040 (see related discussion for contaminant-specific requirements). Clothing and other personal contamination should be monitored and removed according to procedures established by a qualified expert; any material contaminated to the degree that a person could be exposed to radiation above any limit specified in 19 CSR 20-10.040 should be retained on-site until it can be decontaminated or disposed of according to procedures established by a qualified expert.	Not an ARAR	These requirements are part of an employee protection law (rather than an environmental law) with which CERCLA response actions should comply; hence, they are not subject to the ARAR process. However, they constitute requirements for worker protection with which the proposed action will comply.
Toxic Substances Control Act, as amended (15 USC 2607-2629; PL 94-469 et seq.); Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761), Subpart A, General	PCB testing	Inspection and testing are required for material contaminated with PCBs.	Potentially applicable	This requirement may be applicable to characterization of material potentially contaminated with PCBs. (Such characterization has previously been conducted for certain structures and would continue as part of the proposed action.)
Toxic Substances Control Act, as amended (15 USC 2607-2629; PL 94-469, et seq.); Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions (40 CFR 761); Subpart D, Storage and Disposal	PCB storage	Material contaminated with PCBs at >50 ppm must be stored for disposal (within 1 year) in a facility that is marked for storage and is not located in a 100-year floodplain. The facility should have a roof and walls to prevent rain from reaching the stored PCBs and an impervious floor with 6-inch curbing to provide a double containment volume. Stored articles or containers should be checked monthly for leaks.	Potentially applicable	Storage of articles or containers with PCB concentrations in excess of 50 ppm is not expected to be part of the proposed action; however, if such material were present and required storage, the requirement would be applicable.

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
National Emission Standards for Hazardous Air Pollutants (40 CFR 61), Subpart M, National Emission Standard for Asbestos	Asbestos management	Asbestos-containing material from manufacturing, demolition, renovation, spraying, and fabricating operations should be wet and sealed in labeled, leak-tight containers to prepare for its disposal.	Potentially applicable	These requirements are considered potentially applicable to the proposed action. (Note that the disposal of asbestos-containing material is beyond the scope of this action.)
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Identification and Listing of Hazardous Waste (40 CFR 261), Subpart C, Characteristics of Hazardous Waste; Subpart D, List of Hazardous Wastes	Hazardous waste characterization and management	A waste must be evaluated to determine if it is a hazardous waste, i.e., either a waste listed in this requirement or a characteristic waste. A characteristic waste is determined by its (1) ignitability (defined by flash point, oxidizer, and other); (2) corrosivity (defined by pH ≤2 or ≥12.5, rate of steel corrosion, and other); (3) reactivity (defined by instability, violent reaction with water, explosivity, cyanide- or sulfide-bearing nature with vapor generation potential, and other); or (4) leachability, as defined by an established toxic characteristic leaching procedure (TCLP); the following are maximum contaminant concentrations in leachate for this factor.	Potentially applicable	This requirement is potentially applicable to the characterization and management of material generated by the proposed action. Contaminated material at the site has been and will continue to be evaluated to determine whether the prerequisites for definition as hazardous waste are met. No waste listed in this requirement has been identified for the site but such testing will continue to determine whether the characteristic definition is met.

Contaminant	Concentration (mg/L)
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.0
Chloroform	6.0
Chromium	5.0
o-Cresol	200.0
m-Cresol	200.0
p-Cresol	200.0

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
(Cont'd)				

Contaminant	Concentration (mg/L)
Cresol	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
2,4-Dinitrotoluene	0.13
Endrin	0.02
Heptachlor (and its epoxide)	0.008
Hexachlorobenzene	0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3.0
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0
Nitrobenzene	2.0
Pentachlorophenol	100.0
Pyridine	5.0
Selenium	1.0
Silver	5.0
Tetrachloroethylene	0.7
Toxaphene	0.5
Trichloroethylene	0.5
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silvex)	1.0
Vinyl chloride	0.2

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart B, General Facility Standards	Hazardous waste storage	General requirements are established for locating and inspecting treatment, storage, and disposal facilities for hazardous waste; determining waste compatibility; and training workers. Location requirements include (1) facilities must not be located within 61 m (200 ft) of a fault in which displacement has occurred in Holocene time (i.e., since the end of the Pleistocene) and (2) facilities located in a 100-year floodplain must be constructed, operated, and maintained to prevent washout of any waste by a 100-year flood.	Potentially applicable	Certain of these requirements may be applicable, i.e., for the storage of material generated by the proposed action if it meets the prerequisites for definition as characteristic hazardous waste (no listed waste has been identified at the site). The location requirements are neither applicable nor relevant and appropriate because the site is not located within the established distance to such a fault displacement or in a 100-year floodplain. Other substantive storage requirements are being and will continue to be addressed as appropriate. (Note that disposal is beyond the scope of the proposed action and that the design, construction, and operation of storage facilities have been addressed under previous actions.)
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart C, Preparedness and Prevention; Subpart D, Contingency Plan and Emergency Procedures	Hazardous waste storage	Treatment, storage, and disposal facilities for hazardous waste must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden release of hazardous waste (or constituents) to air or water that could threaten human health or the environment. A contingency plan must be in place and emergency procedures must be implemented to minimize releases of hazardous waste from each facility.	Potentially applicable	These requirements may be applicable, i.e., if material generated by the proposed action meets the prerequisites for definition as characteristic hazardous waste (no listed waste has been identified at the site). The substantive storage requirements will be addressed as appropriate.

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart E, Manifest System, Recordkeeping, and Reporting	Hazardous waste storage	Various administrative requirements are established for treatment, storage, and disposal of hazardous wastes.	Not an ARAR	These requirements are neither applicable nor relevant and appropriate because they constitute administative requirements for an on-site CERCLA action.
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart G, Closure and Post-Closure	Management of hazardous waste tanks	A waste facility such as a tank system should be closed in a manner that controls, minimizes, or eliminates post-closure escape of hazardous material, leachate, contaminated runoff, or hazardous waste decomposition products to groundwater, surface water, or the atmosphere to the extent necessary to protect human health and the environment.	Potentially applicable	Although final closure is beyond the scope of the proposed action, these requirements may be applicable to management of process tanks in the chemical plant buildings, as part of initial closure activities, if material in the tanks meets the prerequisites for definition as hazardous waste.
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart H, Financial Requirements	Hazardous waste storage	General financial requirements are established for owners and operators of hazardous waste facilities, including storage facilities.	Not an ARAR	These requirements are neither applicable nor relevant and appropriate to the proposed action because the federal government is specifically exempted therefrom.

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart I, Use and Management of Containers	Hazardous waste storage	Containers used to store hazardous waste must be closed and in good condition. The storage facility for hazardous waste must include a containment system with an impervious base designed and operated to drain liquid that could result from leaks, spills, or precipitation, unless containers are located such that they would not contact accumulated liquid (waste that does not contain free liquid does not require such a system). The facility must also contain a collection area for drained liquid and a runon prevention system, unless the collection system has sufficient excess capacity to contain any runon. Incompatible wastes should be separated, and weekly inspections should be made.	Potentially applicable	These requirements may be applicable, i.e., if material generated by the proposed action meets the prerequisites for definition as characteristic hazardous waste (no listed waste has been identified at the site). The substantive storage requirements are being and will continue to be addressed as appropriate. (The design, construction, and operation of such facilities have been addressed under previous response actions.)
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264); Subpart J, Tank Systems	Management of hazardous waste tanks	For closure of a tank system, waste residues should be removed or decontaminated, and closure plans should be prepared.	Potentially applicable	Although final closure is beyond the scope of the proposed action, these requirements may be applicable to management of process tanks in the chemical plant buildings, as part of the initial closure activities, if material in the tanks meets the prerequisites for definition as hazardous waste. The substantive requirements for a closure plan related to these activities will be addressed in the work plans to be prepared as part of this action.

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart K, Surface Impoundments	Hazardous waste storage	Requirements are established for the design, construction, and operation of surface impoundments used to store hazardous waste. Such impoundments should contain systems to control occurrences such as runon and overfilling, and they should be inspected weekly and after storms during operation.	Potentially applicable	These requirements may be applicable to the proposed action, i.e., if material generated by the proposed action meets the prerequisites for definition as characteristic hazardous waste (no listed waste has been identified at the site). Substantive requirements for operating such a facility will be addressed. (The design, construction, and operation of such facilities have been addressed under previous response actions.)
Solid Waste Disposal Act, as amended (42 USC 6901, et seq.); Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart L, Waste Piles	Hazardous waste storage	Requirements are established for the design, construction, and operation of waste piles used to store hazardous waste. Hazardous waste piles that are not inside or under a structure providing protection from precipitation, runon, leachate generation, and wind dispersal and that could be subject to wind dispersal must be covered or otherwise managed to control releases. In addition, such piles should include runon and runoff control systems to address the peak discharge from a 25-year storm and a 24-hour, 25-year storm, respectively. Such piles should be inspected weekly and after storms during operation.	Potentially applicable	These requirements may be applicable to the proposed action, i.e., if material generated by the proposed action meets the prerequisites for definition as characteristic hazardous waste (no listed waste has been identified at the site). Substantive storage requirements will be addressed. (The design, construction, and operation of such facilities have been addressed under previous response actions.)

TABLE B.3 (Cont'd)

Potential ARAR	Action	Requirement	Preliminary Determination	Remarks
Missouri Hazardous Substance Rules (10 CSR 24); Missouri Solid Waste Management Law (RSMo. 260.200 to 260.245) and Regulations (10 CSR 80); Missouri Hazardous Waste Management Law (RSMo. 260.350 to 260.552) and Regulations (10 CSR 25)	Hazardous waste storage	The owner/operator of a hazardous waste treatment, storage, or disposal facility should comply with the requirements established in these regulations (including those for facility siting and design), in addition to those of 40 CFR 264 (see related discussion in this table); in the case of contradictory or conflicting requirements, the more stringent shall control.	Potentially applicable	These requirements may be applicable to the proposed action, i.e., if material generated by the proposed action meets the prerequisites for definition as characteristic hazardous waste (no listed waste has been identified at the site). The substantive storage requirements are being and will continue to be addressed for areas designated as potential hazardous waste storage areas (e.g., Building 434 and the TSA). (The design, construction, and operation of such facilities have been addressed under previous response actions.)
Hazardous and Radioactive Mixed Waste Program (DOE Order 5400.3)	Mixed waste management	The hazardous waste component of hazardous and radioactive mixed wastes should be managed according to the requirements of the Solid Waste Disposal Act, as amended, and the radioactive component of radioactive mixed waste should be managed according to the requirements of DOE Order 5820.2A (see related discussion in this table). Waste minimization measures should also be implemented.	To be considered	Although not promulgated standards, these constitute requirements with which the proposed action will comply if material generated by the action meets the prerequisites for definition as hazardous waste; in this case, the substantive requirements of the Solid Waste Disposal Act, as amended, will be addressed.

APPENDIX C:

ENGLISH/METRIC - METRIC/ENGLISH EQUIVALENTS

TABLE C.1 English/Metric Equivalents

Multiply	By	To obtain
acres	0.4047	hectares (ha)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in.)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
pounds (lb)	0.4536	kilograms (kg)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)

TABLE C.2 Metric/English Equivalents

Multiply	By	To obtain
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
hectares (ha)	2.471	acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)